The Journal
OF THE
Royal United Service Institution.

VOL. XVI. 1872. No. LXVII.

LECTURE.

Friday, March 22nd.

LIEUTENANT-GENERAL THE HON. SIR JAMES LINDSAY, K.C.M.G., Inspector-General of Reserve Forces, and Vice-Chairman of the Council, in the Chair.

"THE STRATEGY OF INVASION, AS EXEMPLIFIED IN THE AMERICAN AND AUSTRO-PRUSSIAN WARS, AND IN THE WAR OF METZ; WITH REMARKS ON CENTRES OF DEFENCE AND THE TRAINING OF NATIONAL FORCES."

By Colonel Sir R. A. SHAFTO ADAIR, Bart., F.R.S., A.D.C. to the Queen.

The CHAIRMAN: Sir Shafto Adair, requires no introduction to the members of this Institution. The Institution has so often benefited by the lectures which he has given, as well as by the models which he has presented to the Museum, that I pay him the compliment of saying that no introduction from me is necessary. He has distinguished himself as a writer, as a modeller, and as a lecturer, and the army has benefited by the service which he has rendered to this Institution. I have, therefore, great pleasure in asking Sir Shafto Adair to come forward and give us his lecture.

Sir SHAFTO ADAIR: It is my first and pleasant duty to express the thanks that I owe to the Council for their consideration in having allowed me to postpone the lecture which I am permitted to give this day. It is a lecture on a subject, as I venture to think, of exceeding importance; one that has assumed a prominence as the social question of our day since I last had the honour of addressing you in this theatre.

The question which I propose to treat, is the "strategy of invasion," and in some degree to endeavour to gauge what may be called the processes of national thought that lead to invasion, and the means of resisting and of consolidating the national forces against it. For though the nation is unfortunate indeed, that is always preparing for war, that nation must be still more miserable that is not prepared for war when it comes. I speak of the "strategy of invasion," and here,

though a definition is proverbially dangerous, I would endeavour to express the force that the word strategy conveys to my mind. There has been, I venture to think, without presuming to say that I shall accomplish the solution, a great confusion made between strategy and tactics. To place the matter before you, I would say that by strategy I understand that preparation for war which makes the success of given movements probable; and tactics to be that preparation which makes them possible. We have seen instances in which high strategic talent may not be connected with the means of carrying strategic movements into effect for want of tactical development in the troops that are employed. On the other hand, a highly elaborated tactical system may not give occasion, or not find employment, for great strategic skill. It appears to me that such is the better way of investigating this question, inasmuch as the idea of invasion, a novel one to a great extent in the forms in which it has been lately made evident in Europe and in America, should be investigated and sounded to its depths. Invasion means a war of a decisive and severe character. Invasion means a war not merely to occupy military posts, or islands, or to divert the course of commerce; but, as we have seen it exemplified in later years, it means that effort of armed force which shall substitute entirely one system of government and ideas for another; or, shall leave the vanquished party so helpless that for years to come it may probably be unable to emerge from the state of humiliation and defeat in which it has been left at the close of the contest.

In reviewing this question, the chief and most prominent agent in the late European wars of invasion is that mass of armed force which is now consolidated under the name of the German Empire, which has been developed on the nucleus of the Prussian monarchy. It may appear strange, but it is clearly to be proved and traced, that the idea of the unification of the German Empire lay at the bottom of all the wars that we have seen on that account of later years. To reduce the question to a simple expression of formula—from Jena to Sadowa, from Sadowa to Sedan was one unbroken continuous line of action. In 1813 the Prussians with a noble courage, recovering from their utter humiliation and defeat, joined eastern Europe in an attack on the French Empire. From 1813 to 1815—16—17, their period of supremacy was unchecked in the occupation of France. Then, I make no doubt that the pressure of French conquest which had held down Germany, generated a craving for German unification, of which Prussian policy became the exponent in the institution of the Zollverein, and has been finally the armed apostle at Sedan. For it will be remarked, that in 1818, the Prussians commenced that course of consolidation by their custom-houses, which they have now welded together by their arms. And in this course of unification necessarily, such a supremacy would probably be challenged, and such has proved to be the case, by the hereditary opponent of the Prussian Monarchy, the Emperor of Austria. Thus, then, the campaign of which the first period terminated at Königgratz, and closed at Blumenau, was forced, as it were, upon these two great empires by that fixed determination of the German-speaking

race to be one people, which had been shown to a slight extent on the dismemberment of Denmark, and received its full development after the defeat of the Austrian Armies.

So, then, we have to consider whether this idea be not of so intense a description as to give a new feature to war; if, in fact, it be not true that the armies of even the eighteenth century are of power inadequate for the demands that are now made upon military resources, in order to gratify desires which are wide as the national impulses. From this point of view it will be seen how wise and sagacious, as well as effective, the Prussian arrangements and preparations have been.

Prepared for war at a moment's notice, with enemies in front, in flank, and in rear, as soon as the hour sounded had struck, Prussia hesitated not for one moment to strike quickly and strongly. And there is a simplicity with respect to the Prussian movements which will dispense with my directing your attention on successive points, to show how the tide of battle ebbed and flowed; for when the quadruple arrangements of the Prussian armies are once detailed, the army of the Main on the proper right of the army of the Elbe, and of the first and second army, and, as will be familiar to you all, the objective point of Vienna in the distance, the whole plan of the campaign of Sadowa lies before you.

I would here request your indulgence for a moment to say, that I do not propose to enter upon the movements that have decided battles. Other writers and speakers have dilated upon them; indeed, the time would fail me if I were to attempt to pause upon many a noble movement, upon many a feat of arms. I propose simply to indicate the detailed movements of the armies, and to enquire how far these are consistent with the principle which I have to lay down, that every nation must have its centres of defence, and that that nation is most fortunate in its preparations for defence which is so constituted, geographically, that the lines of hostile approach must be known. On this I shall have to speak more at large when I come to the defence of our own shores.

Thus, then, with sudden surprise, the Prussians broke up from Berlin, leaving to the army of the right-flank the care of the outlying Hanoverians and Bavarians, and pressed forward with a boldness which might almost be considered rashness, if they had not been perfectly confident of their own resources and power of reparation in losses or defeat. They could not have known of the resistance they were likely to encounter, or how far it would fail the Austrians, like the broken reed, when the hour of struggle came, as it did in too many instances. This they could not have known, but confident in their own strength they pressed forward, and after subjecting themselves to the chance of considerable reverses, with the objective point of Vienna before them, the great fight at Königgratz or Sadowa was fought, which is the term of the ascendancy of the Prussians in the Germanic empire. I propose before I leave this subject to remark generally upon the military advantages which the Prussian system presents. But at this juncture one magnificent strategical movement or inspiration seems to have waited on Prince Frederick Charles, the Commander of the first corps. He guessed, though he did not know, where the Austrian

troops would probably meet him. He requested that the King (now the Emperor) would order that flank movement of the Crown Prince which decided the battle of Sadowa. As regards the mere matter of mere fighting, I am inclined to think that the battle of Sadowa or Königgratz proved not much more than the desperate courage of the soldiers on each side. It was a battle of parallel lines; it was a battle of hard fighting, until the moment came when the fresh troops of the Crown Prince drove the Austrians in retreat upon their fortresses, and would have utterly demoralised that army, failing the courage and self-sacrifice of that column of cuirassiers, which led by an English soldier covered the retreat of the Austrians on that disastrous day. I know that soldier well. He went down into that battle with his column of cuirassiers as if he had been a child born of the country as he was a soldier sworn to her standards. He was left on that field, but has recovered to lead hereafter, I trust, the Austrian armies whenever he may be required.

Then came the movement on Frohsdorf. Here, with regard to the strategy of invasion, and the resolute countenance of either army in these fights, it was a question, it might have been a question, whether the war would conclude. It may be thought that under ordinary circumstances the war would not have been concluded. But there was Hungary doubtful, there was Italy always threatening. But, on the other hand, there was the Entrenchment of the Frohsdorf, which it would cost much to reduce, as may be learned by a plan drawn by an Officer of the Royal Artillery, Mr. Nolan. More than that, there was yet time to the Austrian empire; and if it had been worth while to sacrifice the capital, to pass to the ridges in rear of the Carpathian mountains, and there to consolidate and prepare a further defence, covering the front with heavy masses of field artillery and light cavalry —in which the Austrians generally were so superior, although not successfully handled in this campaign—and then bringing up every man and horse even from the distant Turkish frontier, then, if it had been worth while, a campaign in Moravia and Silesia might have ended in planting the Austrian eagle in Berlin. But in this case Austrian victory was neither looked for nor anticipated. In the judgment of the Austrian Government, no such contest at that time was possible. Austria abandoned her place of pre-eminence in Germany, and it was filled, as of right, by her conqueror.

Sadowa led to Sedan. It was well known how a jealousy of lost power and military credit rankled in the French heart and precipitated the war of Metz. It has always appeared to me that it is well to stamp a war or campaign by the most prominent incident during its progress. The siege of Metz, or rather the investment of Metz, was the turning point of that campaign in France. But when we consider this war of invasion it must have struck you how very different the line of invasion of France was from that followed on any former occasion. The line of invasion in the great war of the Republic during the time of the Convention was principally on the north-western frontier of Germany or from the direction of Austrian-Flanders, and thence passing eastward as far as the passes of the Argonne, in Champagne. The French

Emperor had now the opportunity of selecting his line of advance and determining its direction. I have often wondered wherefore he adopted that special line of entrance into Germany. It was avowedly a portion of the Imperial policy to operate upon the probably discontented populations of the Main, and so to make friends and allies in southern Germany. It may have been that for reasons of military expediency he wished to have a fortress to rest upon; but whatever those reasons may have been, the campaign now begun, was virtually lost so soon as the French Armies deliberately rested on their mass of fortresses and on neutral territory. For it is most striking, that in this campaign, one of the oldest and most honoured maxims of war, on the small scale at all events, and I think on the large scale, has utterly shown to be inapplicable. We know that to have a flank "*en l'air*" is notably an exceedingly dangerous position, whereas to have a "supported" flank or "*en appui*" gives confidence and consistency to an advance or security to your defence. But here the protected flank was the dangerous one; and at an early period of the campaign, if the French Armies had fallen back leaving a clear flank of action on their left as they had on their right, it would not have been possible to have brought them into helpless masses, jammed up as they were against an impassable frontier. No doubt the Prussians saw their advantage in that respect; for it seems to me there was the tendency in the Prussian movement always to keep the left shoulder forward, and gradually to drive the French past fortress after fortress and battle-field, till at last, which could scarcely have been anticipated, the "*impasse*" of Sedan forbidding further retreat, closed the first act of the war, and left the Emperor and his armies prisoners. Yet the Prussian strategist could never have anticipated such a sudden termination to the resisting power of the French regular armies.

No doubt it was in his mind, it is probable as an alternative, that one great battle would have been fought at Chalons. Chalons had been selected for the practice camp of the French armies during many military seasons. It is eminently adapted for the defence of the capital. And here I would remark upon the difference between the mode of defence adopted in the late French campaign, and in that glorious campaign of 1813, when the great Napoleon kept three armies at bay in the open country. His flanks were unsupported, and he shifted his flanks so that they became fronts, and drove the enemy, as long as material force lasted, from the road to Paris. The accounts of the battles of Champaubert, la Fere Champenoise, and other battles in Champagne, show with what activity and success he manœuvred. It will be remarked also that the only point at which the late French line of defence touched the French line of 1813 was at Laon. At Laon, in both cases, a combat ensued. But in 1813 it was a combat on the way to Paris, and was won with difficulty after the great fight of the plateau of Craonne. The original line of defence as shown in the maps on the wall is the lower line, which is not marked by flags, but simply by these discs showing the way to Paris. Still I cannot suppose the Prussians, in the first instance, anticipated that thus the objective point, Paris, would be reached at last, and the sub-objective points,

Metz and other fortresses, be masked, and observed eventually to surrender.

Now, Paris had been fortified with care many years previously. It had been fortified, it would appear, with a double motive, against internal insurrection as well as against a coming emergency. Those who are acquainted with Paris, those even who look at this model on the table, will concur in opinion, that the defence of Paris, from a military point of view, is shorn of more than half its value; that, in effect, the forts furnish facilities to siege operations, and to attacks which materially impede their uses. In place of dominating the country, they dominate the capital. Any works that are brought in attack against these forts, are brought in attack also against the city that lies below. There is scarcely one of them so well advanced on the outer country as to prevent an enemy seeing to the reverse slopes; that is the great principle on which towns should be protected by works; and it is on that principle that I maintain now, as I have always maintained, that London is the most defensible capital in Europe. It was a matter of surprise, I make no doubt, that Paris was invested and not besieged, for there are so many points of attack from which decisive speedy results would have been obtained, that if it had consisted with the Prussian system such, doubtless, would have been the application of siege power. For instance, the weakest point of Paris is on the peninsula of Charenton. Forcing siege approaches in the throat of that peninsula, and turning a double line of attack right and left, fortress after fortress would lend itself an easy prey, each affording lodgments in succession for the capture of the next; and once in possession of these heights, the enceinte of Paris is perfectly worthless. It is a polygon of long faces that are a provocation to enfilade fire. The bastions have scarcely a point of flanking fire; and from their very long reach and stretch, they would be utterly untenable by troops holding the lines.

But here let us begin to do justice. With this difficult fortress to maintain; with a population whom no one could trust or credit with the possession or practice of the qualities of resistance and endurance; the armies of France dissipated; her Generals on parole; there were found men who did not despair of France, and who maintained a resistance, which, however it may be discredited, was noble and patriotic in the extreme, so long as the chance of assistance or relief from the country had not failed them. Men talk of Trochu as a dreamer and enthusiast, but he had the noble enthusiasm that acts on the hearts and spirits of men. And when we come to consider more closely the conditions under which Paris was held, it will be said that to Trochu and the soldiers of Paris, and, above all, to those *gardes mobiles* who showed, as Frenchmen, a spirit worthy of their sires, that honour should be given.

And now one of the natural lines of defence comes into play, the line of the Loire. It has always been the tradition of the French armies to retreat on the Loire. Napoleon, after Fontainebleau sent his armies to the Loire. Behind the Loire was power of resistance sufficient, if other circumstances had been favourable, to have enabled the

French Generals to concentrate their troops. It was otherwise. Chanzey and his bravery, and the sacrifice of hundreds of thousands of lives of young Frenchmen; the splendid manœuvring of Faidherbe in the north-west; the desperate flank movement of Bourbaki to the east in the endeavour to enter Germany, were all lost; and Prussian endurance was rewarded, and justly rewarded, by the subjection of France itself.

Now, I speak of what the Prussian merit consisted in. To my mind the first is the great tactical merit of *continuity*. To put the matter in a not exaggerated shape, it would have been perfectly possible during the war for the Prussian soldier with his *feuille de route*, to pass from Lubeck on the Baltic, to Rouen on the Seine, and to report himself every day to a Prussian detachment. It is that marvellous continuity which permits of no break, which brings forward not only the fighting man but the stores and the ammunition, which makes the fighting man available, which, above all—and I believe there is much in this—connects the man with his country, so that the landwehr sentry watching before Strasbourg, felt that there was a continuous electric chain between him and his household in Pomerania; it is this which I hold to be the prominent advantage of the Prussian system. It may be questioned, and I do question, whether this tactical rigidity is altogether the best for soldiery, general, or armies. Tactical rigidity was not that power which won the battles of the peninsula. Tactical rigidity is not that faculty which won the battles of India. Tactical rigidity is not that force which cleared the Caucasus, that wonderful effort of Russian soldiers. It was the pliability, the elasticity, the making the most of circumstances, never being discouraged, and not being compelled to have the machine in the most perfect order that it might work at all, that has given an advantage to the elastic system. But the Prussian system has done its work, and done it well.

On three points we are indebted to Prussia for material improvement. The Prussians discovered, and with a happy result, the means of defending the salient of a bastion. The Prussian casemated mortar battery is one of the most ingenious applications of artillery fire to the defence of the weak point of fortifications. The Prussians also developed the polygonal system under which Todleben so defended Sebastopol. They have also organised in this system a mode of defence suitable to their Volunteers; for their Landwehr are to a great extent equivalent to Volunteers. A Prussian fortress is always accommodated with large *places d'armes*, wide ditches, and ramps of easy access, the object being to precipitate the garrison into the country; and for these three additions to military science, Europe is indebted to the Prussian school.

Time does not permit me to go further, therefore I will now pass to a war of stupendous area, a war of unanticipated duration, a war than the results of which, none have been more conclusive. I speak of the war between the Federal and Confederate Governments of North America. We are indebted to an Officer of the Household Brigade, Colonel Fletcher, for three volumes on the great war of the United States. I may say that the fluctuating fortunes of that fight are described with a clearness that only requires time to appreciate and to

master in detail. The work is illustrated by maps, which give precisely what a military map requires, that is to say, the points of movement and the point of attack, the main features of ground, and nothing more. The growth of this war is very remarkable. From 70,000 men, which was esteemed sufficient in the beginning of 1861, the demands rose in 1862 to 663,000 troops on the part of the Federal Government alone. The war was then spreading in every direction, and from the circumstances of the country it required that elasticity which I have already insisted on as essential to great military systems both by land and sea.

I hardly know how to bring the conditions of this war more clearly before your minds perhaps than by this. Think of a great country, bounded by the Atlantic on its extreme eastern coast, and by great rivers to the westward; inhabited by a population of resolute, determined men, men accustomed to the hard active warfare of life with head and hand, and this country to a great extent still covered with the primeval forest. Think that the two portions of this great country are arrayed against each other, and that the line of battle is limited to a comparatively narrow portion, of which one side shall be formed by the Ohio and the Mississippi, another by the sea, and that the northern boundary is divided, not unequally, by the far stretching chain of mountains which, rising in Vermont, pass downwards to the plain of Georgia. You will then imagine two capitals, the objective points of attack respectively: Washington, the capital of the Federals, Richmond, that of the Confederates. You will see that these points of attack are so near in connection, that it is marvellous one or the other should not have succumbed in the first campaign. From Washington to Richmond in an air line is but 110 miles, and yet it took more than five years to cross that interval to the destruction of the Confederate power and of the Confederate Government sitting at Richmond. This peculiar conformation of the country, naturally suggested first movements principally influenced and controlled by the rivers, which between Richmond and Washington, run in parallel lines. To the north of Washington were mountains dividing Virginia from Kentucky and Tennessee, through which the great strategical movements of most of the campaigns were effected. Beyond, to the west and southward, spread the Mississippi, the Ohio, the Tennessee, and the Alabama and other rivers, all capable of floating navies, and of course therefore largely adopted into the system of warfare. Then came the war beyond the Mississippi, which, however, was desultory, and never led to any great results.

It was felt by McClellan, the first distinguished General of the Federal forces, that on this great service, and with such means of resistance, novel plans of operation were imperative; and this was his plan. He proposed to drive the enemy out of Virginia, and to occupy Richmond, Charleston, Savannah, Montgomery, Pensacola, and New Orleans; in other words, to move into the centre of the enemy's country, and crush out the rebellion. This was the way he proposed to crush out the rebellion in six of the most powerful and warlike States of the Confederates. Then, to pass up these great rivers,

studded as they might be with material impediments, and bristling with the enemy's riflemen, with a determination to make effectual what has been called in America the anaconda plan; that is the plan of constriction, as the boa constrictor compresses the wild animal. And by the indomitable spirit and inexhaustible resources of the Northern States, this plan was completed to the destruction of the Confederate Government.

I have taken some pains to form a list of the battles; but in the multiplicity of actions it is impracticable to dwell upon them. In five years of fighting there were 46 battles, many of them of two, three, and four days' duration, and one, the great battle of Richmond, of seven days. There were twenty-four combats, by which I distinguish those actions which are smaller in numerical force of combatants, and in the results, than the great battles. There were twelve naval expeditions. There were forty-two military expeditions in force, commanded by general Officers, acting for strategic purposes. There were twenty-two forts captured and twenty-four cities occupied. These are some of the results, and if time were afforded to detail the incidents of these movements, the interest would be well justified. But perhaps the greatest action of the war was that of Chancellorsville, fought by the Confederates under that remarkable soldier, Lee, supported by Stonewall Jackson. And there strategical and tactical power were strikingly exemplified. Lee massed his inferior forces—inferior in number—on the proper right of the Federals. He passed a whole Army Corps to the rear of their right; he passed them without being seen, or if seen, without being suspected, and thus engaged, and won that great battle, about which, after all, like most of the American battles, the faithful historian reports in a single word, "indecisive." It seems that the strategical talent which was shown by Lee, and especially by Jackson, in the campaign of the Shenandoah valley, by Burnside on the Federal side, and by other Generals, was sufficient to bring the troops up to the point of attack, but after arriving there the struggle was left to a great extent to the soldiers themselves. A great deal, of course, may be attributed to the nature of the country. And it is constantly remarked by the historian that the Generals were almost unaided, in the first parts of the war, at all events, by the assistance of the Staff, which is so necessary for securing the execution of orders, even for brigade or division, on a field day. Then, the country, being dense with forest, originated and made necessary one novel mode of conflict. Lines were formed, troops advanced, one mass of fire overpowered the other, retreat ensued, and was but seldom consummated into rout, for the cavalry were not sufficiently trained for this purpose, nor were the troops held in reserve sufficient to make the rout effectual. Consequently, even after such actions as Antietam, which relieved the Western States, as those of Cedar Mountain and the Blue Ridge did the Eastern, a decisive result was but very rarely attained.

But the difficulty of the country generally brings into play a remarkable quality of the Federal and Confederate troops, namely, the habit of entrenching. General Grant's plan was to entrench, and then move forward from either or from both flanks. If repulsed, the epaulement

which had covered the troops received them again to shelter. If successful, he advanced and entrenched again. In the twenty-five miles traversed by the troops after the defeat at Shiloh, or Pittsburgh-Landing, they entrenched seven times. Such work has never been done by any army in the world since the Romans pitched their camps in this country. And the mode of entrenchment is suited to the character of the troops. As the regiments halt in line, arms are piled, and from each company working parties of twelve or fifteen artificers, with spade, and pick, and axe, are detached to the front. In forty minutes an epaulement proof against musket shot is thrown up, and in two hours a field rampart, proof against field artillery. The troops of either army entrenched in the morning, and again in the afternoon. Then came out the sterling character of the soldier, showing what manner of men these were—peaceful men, brought from every region of the United States, but, alas! for the purpose of fratricidal combat. The cavalry of the Confederates was at first of exceeding excellence for partizan warfare, though I can remember but one instance of a charge in mass. But, again, mark the enduring spirit of the North. Gradually the cavalry of the north combatted on equal terms, and the raids of the Northern troops were carried as far within the Southern lines as Richmond, just as the partizan leader, Morgan, had harassed Washington and passed round into Pennsylvania. Deeds of brave soldiers, there were many; movements of scientific Generals, there were many; tactical achievements, there were few or none.

Now I pass to the Navy; and here the qualities of the national character were developed with skill and intensity throughout the whole line of the American coast. There are some portions of the history of the sieges on the coast which will bear comparison with any in our European history. For instance, the bombardment of Fort Wagner, and the unfaltering endurance of the troops who carried on those approaches, stand side by side, and without disparagement, to the great valour and constancy of the artillery who held the Chofre batteries before San Sebastian. Higher praise, in my opinion, there is none to give.

And so the war passed on, and I find that I must even abbreviate much that I intended to say. But as a supplement to my opinions and theories, let me read to you what the American armies of the North effected in their organisation. I hold in my hand the return of the Quartermaster-General's department in the last year of the war, giving a complete account of the state in which the war had left the Federal war department; the stores and supplies. He says "the transport "fleet exceeded a thousand vessels, of every variety of construction, "impelled by sail or steam."

We have heard of the destruction of the railways, this is what the repairing corps did:—

"The Etowah bridge, 625 feet long, 75 feet high, was burned by "the rebels, and was rebuilt by the labour of 600 men of the construc-"tion corps in six days. The Chattahoochie bridge, six miles from "Atlanta, is 740 feet long, and 90 feet high, and was built in $4\frac{1}{2}$ days "by 600 men of the construction corps."

That shows how effectual their organisation was. The Report says:—

"The close of hostilities made even greater exertions on the part of "this department necessary; 233,000 men were distributed from "Washington alone to their homes in the north, carried to every "hamlet and village, camps of discharge being established in every "state at which the regiments rendezvoused until paid off, when the "men dispersed. 60,000 men of the army of General Sherman were "moved from Washington to Louisville, from which place, after a "short time, they were put in motion for their homes, and discharged. "25,000 men were moved from the James river to the Rio Grande. "7,000 men were sent from the Potomac to Savannah. 60,000 "prisoners of war, released, were sent to their homes in the Southern "States."

The purchases were enormous. The purchases of cavalry horses during the year ending June 30th, 1865, are reported to the number of 141,632. Of artillery horses from September 1, 1864, to June 30, 1865, 20,714. These show the vast proportions of the organisation of this army.

With regard to the army that was formed by General Sherman, and that advanced through Georgia, and determined the struggle at Savannah, this is reported:—"This army of 100,000 men needed to be "entirely re-clad and re-shod, the troops were to be fed while resting, "for as soon as the army ceased its march, it ceased to supply itself by "foraging, and depended upon the supplies from the coast." This is on the 25th of March. "Nevertheless on the 7th April I was able to "inform General Sherman that the necessary supplies were in his "camps."

With regard to the transport fleet there were in the last year, 719 vessels of 224,984 tons assembled. The movements of railroad transportation were most remarkable. The entire command, which was ordered from North Carolina to co-operate with General Sherman, "including a brigade of artillery and the seventh division of the cavalry "corps, was embarked on the fleet. It consisted of 17,314 men, 1,038 "horses, 2,371 mules, 351 waggons, 83 ambulances. The embarkation "began on the 5th February, 1865, and was completed on the 8th. "The fleet sailed on the 9th, and the command arrived at New Orleans "on the 23rd, having been moved in 13 days 1,330 miles."

Said I not well that a nation is unfortunate that is not always prepared for war, though it may not be disposed to seek war? Consider and ponder what was done by that American expedition.

Then, with regard to the engineers, we must fairly consider in a period of peace what our nation and other nations are doing. This is very striking to me in the American system, that it is so elastic, and brings evidently talent of every description into its service, and utilises it to the highest point. Now with regard to the corps of engineers. There are only 106 commissioned engineers drawing pay as United States' Officers, and during the year 1870 appropriations were made for sixty forts on the Atlantic coast, for four forts on the northern frontier of the States, for fifteen batteries on the Atlantic coast, for three forts on

the Pacific coast, and five batteries for San Francisco and its dependencies. And not content with these warlike appliances for the protection of the country, sixty-three special surveys are appointed for the great rivers and falls of the United States. Great as that country has been in the past, great as it has been in peace, I think we may say, it shows a stupendous aptitude for the struggles of war.

And yet I am not one of those who are inclined to believe in the invasion of Canada. Measuring forces, I believe Canada to be perfectly defensible so long as the people of Canada are determined in their defence. I believe Hamilton and London, Montreal and Quebec, and the lines of the lakes, with the facilities which they give us for bases of operations, with a population armed and earnest in their defence, would require but a very trifling assistance from the Imperial forces to make such a defence possible, as would disincline for any attempt to occupy that country.

I have but a few moments more at my disposal; therefore what I intend to say must needs be very brief. After twenty-five years, we have at last come to the decided conclusion to admit a system of national defence among the institutions of the country. It has always appeared to me that it required nothing but the thorough will of England to make our defence by regulars, militia, and volunteers, perfectly and thoroughly effectual.

And now I would remark upon what I have said, that that country is most fortunate which is so placed that the lines of approach to the objective point, must be known. That is one of the advantages that we possess as an island. We know where troops can be landed. We see how rapidly they can be brought to a landing, and we know what time they take to be disembarked. But here I enter my distinct protest against the idea that our defence is exclusively in our fleets. If we are to retain these fleets for defence in our own waters, we have expended vast sums, and trained generations of seamen century after century, to very little avail, and for very little purpose. The place of the British active fleet is off the enemy's harbours, or searching the enemy's coasts. Defend our harbours by floating batteries, or razées, which can be well employed as a steam guard round the coast. But send the thunder bolts of war where they can be felt by those who would assault you. Do not let them linger in inglorious peace within the four seas of England. To such employment I repeat a decided and distinct protest.

If it will be permitted me, may I for one moment call attention to the ponderation of war, so to speak? for, after all, war is a question of weight, a question of mechanics and mathematics, as in the means of attack possessed by foreign forces. The maps which you see here were made by me in 1855, to show what were the means of resistance by means of our Militia, Pensioners, and Yeomanry alone, without the now existing Volunteer forces, to an invading force of 220,000 men. It will be observed that I have shown the course which an invading army must follow, and what local national forces are available for resistance. Without speaking of the patriotism or national spirit as amongst our best resources, without counting the masses of volunteers, which we could

now throw forward with weight of fire, with their splendid rifle practice, I am of opinion that the statutory strength of England is perfectly sufficient, if organised and armed, to cope with any force that can be brought against it, to the extent that I have indicated.

Now, I have said that London is one of the most defensible capitals in Europe; I believe London to be *the* most defensible capital in Europe. The plan before you I made some years since. You will observe there the line of musketry and artillery parapet, and all the various works that support and give flanking fire to those lines. I have supposed that London is defended for the moment merely by 180,000 volunteers, that is to say, a rifleman to every yard of parapet. But in order to advance into the open in line of battle on the Prussian system, and fight under cover of fire from the forts, on the outer line is shown how the troops may be massed for movement. In the inner line is placed an equal number of battalions, the same number of troops. But without the assistance of even slight works, it will be perceived that whereas, in the inner line the battalions can scarcely feel each others' flank, on the outer line, with the assistance of the batteries, they may be formed into substantive brigades and combined into brigades for advance into, and manœuvres in the field. Again, London, from its peculiar position, from the screen of hills that shelters it north and south against hostile observation, from the noble plain of manœuvre that opens to the westward, and from the difficulties and intricacies of the eastern approach, is the most defensible of the capitals of Europe, if we have only made up our mind that it shall be defended. I make no doubt that those who are responsible for defence, are aware of the points at which troops should be massed; and there I leave that question.

But before I conclude, let me with your permission say a few words as to the present state of our home organisation. We have all hailed with great satisfaction the desire of the Government to give effect to the national feeling that a national defence must be organised. We have seen that it was proposed to have depôt centres of recruiting. I have heard officially, that there has been a misunderstanding as to the circumstances under which service battalions will occupy quarters in this country. We are told, and I think it is a most wise arrangement, that depôt companies for the purpose of recruiting, shall be fixed at certain centres, whence they are to draw recruits for the service of their respective regiments. This arrangement, then, shows great wisdom; it is moreover a mechanical advantage. Thus, in the event of a great press or demand, such as occurred during the Crimean War, the weight and pressure would be distributed over many points, and recruits would be drawn from many sources instead of resting an absolute dependence on the same centre of population; for from it, recruits could not be obtained possibly in numbers, certainly not of the quality required, while, at the same time, you fail to interest the whole country in the national effort. Therefore, these depôt centres seem well conceived. But I would suggest whether, of the regiments with which these depôt centres are connected, if one be not constantly on home-service with the depôt, especially in the case of two-battalion-regi-

ments, whether on the whole the advantage that is anticipated will probably be secured? The young soldier, we are told, is to be induced to join from what he hears of the service of the regiment, and from finding comrades in it of his own county. When a regiment returns home from India, if it was directed on its depôt centre, the young soldier, who is then recruited, will learn what are the conditions of a soldier's life in India. But, supposing this regiment has not been completed in its own district, then the previous difficulty is repeated; and you fall into it with the disadvantage of having failed in a plan of much promise. The area of recruiting cannot be increased by establishing depôt centres. What is intended is to make the service more attractive by showing the recruit what he is to expect if he joins his county regiment. I must be forgiven for doubting whether depôt companies dissociated from the head-quarters of the battalion corresponding, are so likely to induce the intending recruit to join as he would do if the regiment were present at these centres on return from foreign service.

Then there is another service. You cannot make the regular service fully acceptable, unless it is acceptable also to the class from which the Militia is recruited. In large towns the recruiting sergeants have prey enough. Those who saw the wretched recruits who were brought up from the manufacturing districts during the Crimean War, will say that such a plan is most dangerous and unsafe, ineffective, and expensive. Perhaps, indeed, in some great stress of war, as the Militia are to assume their place as an army, Militia regiments may be detached to the front; but feeling that you must have recruits of a better class than those we obtain in large masses, and as the object of the "depôt-centres" is to obtain recruits of that kind, and obtain them in that way, the recruit must be satisfied with the circumstance of his service by seeing the home battalion when it returns from foreign service, and to obtain further recruits, it must be made acceptable to the Militia.

Let me state what my experience is of the recruiting service in the Militia. In twenty years I have passed 3,000 recruits through my ranks. I have seen much of them; and especially of late years the recruit is a young man well grown, with a power of growth, without any serious disability or disqualification—I mean other than physical; but the Militia recruit, though he has a man's stature, he has not a man's strength, or a man's skill; therefore, he does not obtain employment all the year round, which employment he comes and supplements in the Militia ranks in an inland county, and in a maritime county in the fisheries and sea service. That lad remains four, five, or six years in the Militia service. At the end of that time he is fully grown—he is a man; he passes off into civil life, and no more is seen of him. But during the period that he might be induced to feel it a fortunate position to enter the regular service, I would take him from the Militia. I would not take a soldier from the Militia in his first year, however long training is given. I would take him in the second year when he came back to the habits which he had formed the first year, and when they were hardening upon him. And taking him in the second year, as a soldier of the line, or a soldier in the artillery, or

in whatever branch of the service it might be, I would as an inducement give him one year of line service for his first two trainings which he had passed in the Militia. Unless the depôt-centre system be more acceptable, first of all, to disengaged free recruits, and secondly to the Militia recruits, I feel that the results which we all desire, will not be obtained; and I cannot but think that the best inducement to the young soldier, is the spectacle of the old soldier returning from service, strong in health, strong in character, ready either for future service or for the position of civil life, and returning into his own county, there to carry on whatever pursuits he may think proper.

I thank you for the opportunity that has been given to me to deliver this lecture. I have endeavoured to show that the "strategy of invasion" requires a sterner preparation to meet it than the wars of ordinary times, and that invasion may take place; for I suppose I shall not be considered very distrustful when I say distinctly, that I have no faith whatever in any governmental arrangements in diplomacy. Any moment may bring us to war. I make no imputations; I raise no doubts; but what was true of Holstein is true of Heligoland; what was true of Holstein is true of Belgium. We should be rash, indeed, who are, if not the guardians, at all events the exponents of peaceful enterprise and civil liberty throughout the world, if for want of military preparation, we permitted any to think that they may insult us with impunity, or war upon us with success.

The CHAIRMAN: I am sure that you will permit me to offer your best thanks to Sir Shafto Adair for the very able and instructive lecture which he has just given us. You will readily perceive the amount of ability and study which he has brought to bear upon the subject. It is no new subject to him, for, as he told you, the maps before you are old ones. He has deeply studied for some years past, plans of defence for England, as well as a plan for the defence of London by means of a chain of forts, and he has presented to this Institution a model of that plan of defence.* Sir Shafto Adair commands a very excellent Artillery Militia regiment. From my experience of the Militia, and my knowledge from reading the reports which have been made of his regiment, I may say that he is—not from early education—a most able artillerist. He has not only commanded his regiment with great ability, but he has taken every pains, by going to Woolwich and to Shoeburyness, and by the study of artillery subjects, to make himself a most excellent commanding Officer. Sir Shafto Adair is a loss to the Army. Had he only been brought up in the Army, I am sure we should have hailed him as a most able assistant in developing our military system. I thank you, Sir Shafto Adair, in the name of the meeting, for the lecture which you have just given us.

* The map of London here referred to will be found in vol. vi, p. 538, and the map for Militia formation, in vol. ii, p. 379 of the Journal.

LECTURE.

Friday, March 15th.

GENERAL THE HON. SIR EDWARD CUST, G.C.L., K.C.H.,
Colonel, 16th Lancers, in the Chair.

EMPLOYMENT OF CAVALRY IN WAR.

By Captain H. M. HOZIER.

"THE employment of cavalry in war" may be divided under two heads —the strategical employment and the tactical employment. Of both of these, various examples were furnished during the late war in France; but the strategical employment of the German cavalry was conspicuous from the very moment of the outbreak of hostilities. As soon as war was declared, the Prussian cavalry belonging to the *corps d'armée* of the western provinces was hurried to the frontier, and there established a line of posts. But it was not content with merely watching the enemy, or endeavouring to screen from observation the movements and dispositions of the heavy columns that were being pushed up in its rear. Almost instantaneously after the declaration of war, this cavalry began to prove on the frontier the ability and intelligence which had been so carefully cultivated during peace. With an audacity which astonished its opponents, it quitted without support its own territory. Officers and troopers alone or in small bodies dashed into France. Sometimes in groups of six or seven, they made wide raids into the hostile territory, broke the lines of telegraph, rushed through the villages, picked up stragglers and prisoners, carried off a few magistrates who might give information as to the expected movements of troops, and returned in safety to their own territory.

The French cavalry was more slow to take the field than the Prussian. This was in great measure due to the difference of organisation. In Prussia each regiment of cavalry consists of five squadrons. Of these, four are field squadrons. As soon as the order for mobilisation arrives, these four squadrons are filled up from the fifth squadron and local reserve, to war strength, and are immediately ready to take the field. An Act of Parliament is always in force by which horses can

be taken from the various districts of the country at an assessed price, fixed by a mixed civil and military tribunal.

In France, on the contrary, there was no localisation of corps; the men of the reserve had often to traverse enormous distances to reach their regiments, and then sometimes found them already marched away. There were no normal depôt squadrons, and no properly organised system of obtaining immediately the extra horses required in war. Thus the French were still engaged in preparation, while the Prussian horsemen were not only already in the field, but making raids to considerable distances into French territory, which caused serious inconvenience to the French military authorities in their arrangements for the early dislocation of the troops. The French cavalry, the branch of the army which should have been the first arm mobilised, which should have been ready to cover every movement of its own infantry, and spy out every movement of the enemy, was, through the vice of a faulty administration, the arm last ready to take the field, and instead of opening the march of the Army, was only in time to close it. This was the fault of proper organisation; no blame can be laid upon the gallant leaders of the French cavalry, who afterwards so nobly endeavoured to atone with their blood for the errors of administrators.

But when the French cavalry did reach the frontier, it was found that it had been servilely trained in those exercises alone which had been laid down in 1829, and which still remained, with unimportant alterations, the standard text book of the service. A French Officer, Colonel Bonie, who has written a most interesting work on the subject, describes the French cavalry as having learnt nothing in the way of science, and forgotten nothing in the way of bravery, but regrets that consequently its bravery could only save its honour without gaining victory as a recompense. The same Officer also fully recognises the great superiority of the German cavalry in everything connected with activity, outpost duty, or reconnaissance, which he attributes in great measure to the power possessed by the Prussian Officers of reading maps easily. This power permits them readily to find their way in a strange country. He says, "the reading of maps among the Prussian "Officers is as easy as that of an open book. Among us, on the con-"trary, it is a fog; it was in consequence, with a radical vice, that we "entered upon the campaign; the result was a disadvantage, for which "the most brilliant courage could not compensate."

It is the author of the above who also says, that, in consequence of having practised without alteration the old-fashioned field exercises, when the French cavalry was in the line of outposts brought face to face with the Prussians, it had no idea of the active and dashing method of reconnoitring which the Prussians employed. Instead of employing single horsemen or small groups, the French employed troops, squadrons, and even regiments to reconnoitre; and with these attempted heavily to check a light enemy, whose movements were most rapid on account of their good horses and small numbers, and who eluded by activity the force which sought to grasp him. Thus the French cavalry was wearied out even before the first battles. To this it is due that, in the early portion of the campaigns, in every action the

French were surprised. The French cavalry was at every point either outwitted, or worn out by incessant marching and counter-marching. Without its cavalry, the French Army and its Generals were not only deprived of their own military eyes, but were laid open themselves without screen or hindrance to the unremitting and incessant vigilance of the military eyes of their enemy.

Part of the weariness of the French cavalry at the very outset of general hostilities, may be doubtless traced to the different manner in which the cavalry was distributed in the two Armies. In the French Army, the various regiments of cavalry were formed into large divisions or even corps, each of which was attached to an infantry corps, and placed under the command of the leader of that corps. In this way the Generals commanding cavalry divisions had great responsibility, but little independence, a certain method of insuring tardy and slow operations. Those who advocate such a disposition of cavalry assert, that unless the cavalry is under the same General that commands the infantry of a corps, the cavalry may move away and leave the front of the unconscious infantry uncovered and unwatched. In the Prussian service a principle has long been adopted which meets this difficulty. To each division of infantry (12,000 men) is permanently attached a cavalry regiment of 600 horses, which furnishes all outposts and vedettes required by the infantry. The remaining cavalry regiments of each corps are amalgamated together into independent cavalry divisions, which can be directed as required to an exposed flank or a dangerous point, which can be pushed miles and miles in front of the Army, and the leaders of which possess that independence and power of prompt action which is so necessary for the efficiency of the arm that they command. Since in our service the artillery has lately been emancipated by the orders of His Royal Highness the Commander-in-Chief from servile adherence to the movements of infantry, it is not unreasonable to hope that an arm still more mobile, and whose action must almost be as swift as the thought that dictates it, may, after the security of the infantry has been provided for, be entrusted to leaders placed in direct responsibility to the Commanding-General of the Army.

It was with regard, however, to these cavalry divisions that one of the few Prussian errors which could be detected in either the organisation for or conduct of the campaign may be perceived. Unlike all other portions of the Army, the Prussian cavalry division is not organised in time of peace, and had to be composed at the commencement of the war. As actually occurred, the delay that was required to carry out this formation was of no practical importance, but had the French Army possessed a first-rate plan of mobilisation, the disadvantage of not having already in peace told off the different regiments to form each division would doubtless have been experienced.

So much for the preliminaries of the campaign. These continued for twenty days, during which the Prussian Generals were, by means of their cavalry, correctly informed of every important movement of the enemy; while the French Staff were ignorant of even where the headquarters of the various German Armies lay. At the end of that time,

so perfect in Germany was the machinery of mobilisation and the railway transport of troops, that more than 500,000 men were close down to the French frontier, and ready to advance into France. These 500,000 men were divided into three armies, under the respective commands of the Crown Prince (left), Prince Frederick Charles (centre), and Steinmetz (right). The German plan was that the three armies should advance simultaneously in a south-easterly direction. Three German armies, roughly, were on the frontier. The Crown Prince lay about Speyer, Prince Frederick Charles in the centre, and General Steinmetz on the right flank. The idea was that the Crown Prince should move down between the Rhine and the Vosges Mountains, and Prince Frederick Charles and General Steinmetz on the western side of the Vosges Mountains, so that if the French concentrated against the Crown Prince, the whole of the Vosges Mountains would be turned by Prince Frederick Charles and General Steinmetz; while, if they concentrated against Prince Frederick Charles, the Crown Prince was to push through the Vosges Mountains and take them in flank and rear on the other side. As the Crown Prince had to move *through* the mountains, he had only one cavalry division in addition to regiments attached to infantry divisions. The rest of the cavalry were attached to the more northern armies.

While the German Armies, shrouded by their cavalry, were silently massing on the frontier, the French Army, totally ignorant of the designs of its enemy, lay in scattered detachments from Sierck to Belfort.

On the 4th of August the French corps which occupied St. Avold, a small town on the road from Metz to the frontier line of the Saar at Saarbrück, made a movement towards the latter place. The Emperor and the Prince Imperial were present, and the French soldiery thought that the advance had at last really begun, and that they were upon the high road to Berlin. The movement was not however pushed for one reason, viz., that it would have been extremely hazardous to have made an advance without some knowledge of the enemy's positions; and such knowledge the activity of the German cavalry prevented the French from collecting. It was the more extraordinary that the French had evidently so little studied or practised this primary duty of light cavalry, as after the campaign in Italy of 1859, the Emperor Napoleon himself had drawn the attention of his Officers to their inferiority in this respect to the Austrians, and had ordered them to devote themselves to the study of "outpost duty." It is clear that the Emperor's orders had not been cordially obeyed, as the Crown Prince was able totally unperceived to mass his forces behind the dark fir woods that lie north of Weissenburg. Here were posted the troops of General Douay, the advanced guard of the corps of Marshal MacMahon. These passed the night almost within earshot of the whole Army of the Crown Prince, but their cavalry gave them no warning of his approach. While they were wholly unsuspecting, the Crown Prince sprang upon them on the morning of the 7th, and drove them back with great loss on the main body of Marshal MacMahon at Wörth.

In this action of Weissenburg, which was fought among rugged and

hilly ground, little opportunity was given for the action of cavalry on either side. The French cavalry only came into action when the contest was already decided, and its infantry already in retreat. The German cavalry found no ground suitable for its movement, but this made it only the more active and unwearied in pursuit of the beaten foe. A French Officer, writing of the retreat from Weissenburg, says, "The weather was fearful; a storm broke out, and torrents of rain "transformed the fields in which we camped into morasses. Not-"withstanding this hurricane, the enemy's vedettes never lost sight of "us; ever on the watch, they studied our positions, reported that we "were not sufficiently strong to fight, and allowed their Army to pre-"pare everything for an attack at daybreak."

In consequence of the excellence of these vedettes, Marshal MacMahon, on the 6th of August, was obliged to accept battle at Wörth, without any idea of the line of march or strength of his opponent. His considerable cavalry of reserve (six regiments of cuirassiers, and two of light cavalry) being hermetically attached to the infantry, was not, as reserve cavalry should be, kept out of fire, but massed in rear of the centre and right wing. Here, soon after the commencement of the action, it was reached by the German shells, and suffered perceptible loss. At last four regiments of cuirassiers were launched against the enemy to restore the battle, which was being quickly lost. Without any preparation, without in any way reconnoitering the ground over which they had to advance, they dashed forwards with the old French enthusiasm. Only a débris of the glittering squadrons returned, without being able to reach the ranks of the enemy, who was unassailable on account of his fire and his position. The Germans, unimpeded by this unfortunate charge, continued to press forward. The French infantry, taken in front and flank, and deeply ploughed by artillery, began to waver heavily. There was only one hope left of saving the infantry; it was the cavalry. Again two Cuirassier regiments thunder against the enemy; again only a few bleeding fragments rush back. The enemy still press forward; and hundreds of fallen men and horses proclaim the impossibility of the success of a cavalry charge against infantry not thoroughly shaken by the fire of artillery or small arms. But these charges were not even made with the best chances of securing success. It was not fully explained to the leaders of the cavalry what was the object of their attack. They were merely told in vague terms that they were to impede the advance of the enemy. The ground over which they were to pass was on this occasion, as on many others during the war, wholly unreconnoitered. As Colonel Bonie, himself an eye witness on the French side, writes, "They, the Cavalry, set out without knowing their object; they "galloped far and wide, and, after having lost many men, those who "escaped, returned without having been able to close with the enemy "or to make use of their arms." Far different was the case in the Prussian service. There no regiment ever moved in line or any close formation without being preceded by scouts. These are usually selected as the best riders in the regiment. They move forward at a rapid pace in front of the regiment, and if they come upon an impass-

able obstacle, such as a morass or a rivulet, gallop along its bank till they find a passable point, and then halting for a few moments, form a landmark to guide the march of the regiment.

Valuable experience with regard to the cuirass was, however, gained in the battle of Wörth. Like the noise of hail on window panes was heard the sound of the bullets on this defensive armour, but no cuirass was pierced, and cuirassiers were seen dismounted, but unwounded, in large numbers. This remark is important, because it demonstrates the necessity of preserving these cuirassier regiments, which some have pretended to be mere relics of mediæval absurdity. It has indeed been urged, that in consequence of modern inventions, the cuirass is solely fit to adorn the museum of the antiquary. The contrary has now been practically proved to be a fact, on the field of battle; and heed should be taken of this fact in the composition of future divisions of cavalry.

There seem to have been, in the French Army, as many controversies and as much dispute on the score of the responsibility for these rash cavalry charges at Wörth as there were on the subject of a light cavalry charge in which our own countrymen rode on a memorable occasion to a glorious decimation, or perhaps rather annihilation. A French eye-witness gives as his experience of the result, that an Aide-de-camp sent with an order to a cavalry Officer to charge, should not appear flurried; for the instinctive idea of the leader is to start on the instant, without, so to speak, taking time to reflect. The sentiment is perfectly natural, since such a leader fears above all else, to be accused by his troops of hesitation or wavering. But if he does not clearly comprehend the aim of his attack, and take time to reconnoitre the ground over which he must advance, he is very likely to cause the total loss of his troops.

Such was the case at Wörth. The wholesale sacrifice of the cavalry saved nothing before the rout of the infantry, and having been sacrificed, was of little use to retard the pursuit after the rout.

Marshal MacMahon, after his defeat at Wörth, retreated on Chalons, closely followed by the Prussian cavalry. All accounts of the action of the latter, from the French as well as the German side, are continuous praise. The French troops were continually harassed by the enemy's presence. To move more rapidly, they sacrificed baggage, equipage, and provisions. Living on what they could hurriedly gather from the country people, they pushed forward, without pause and without any lengthened halt. On the 10th August they reached Luneville, and here hoped to have outstripped their pursuers, and to have a momentary rest. Fires were lighted, rations were served out, and the men began to cook their dinners, when suddenly an order to march at once, arrived. The camp kettles were overturned, the forage was taken away from the horses, and they bridled up in all haste. It was again the enemy's cavalry which was closely dogging their footsteps, and denied them even half an hour's repose. Ever nearer and nearer still, the Prussian cavalry closed on the hurrying columns. Prussian Uhlans dashed into Luneville, almost before the French vanguard had left. Some squadrons even pushed beyond the retreating enemy, occupied the road he

wished to take, and forced the whole army of Marshal MacMahon on to a different line of retreat. In such cases not only the physical, but the moral force of cavalry, came vividly into play.

By the action of Wörth and the subsequent retreat, the French cavalry of the corps of Marshal MacMahon and de Failly was ruined. This ruin was possibly accelerated by the system of bivouacking instead of taking up quarters. The Prussians, on the contrary, always take up quarters, where possible, in villages, instead of bivouacking in the open. This system allows the troops and horses to rest better, and is less severe on the inhabitants of the country, as it does not ruin in the same manner their fields, gardens, and orchards. Many authorities who have written on this subject, have expressed their opinion that nothing reduces the strength of the horses so much, as a continued series of night bivouacks; nothing undermines discipline more, than allowing the men to get accustomed to take everything just as they find it, or the necessity of permitting them to disregard the cleanliness of their persons and equipment; which it is impossible to insist upon, when they are exposed day and night to all weathers. Outposts unfortunately must bivouac; but this necessity should apparently be as far as possible reduced to a minimum. The use of camp-equipment seems to be inadmissible for cavalry in war. In case of hurry or surprise, it would be impossible to pack it in time to allow the squadrons to be of use, and in Europe, where there are always plenty of villages and farms, its employment would be only an incumbrance.

Having so far followed the cavalry, which acted at the commencement of the campaign under the Crown Prince, we must turn to that under the orders of Prince Frederick Charles. This General had under his command five divisions of cavalry. With these he formed a screen across the front of his Army when he pushed forward, sometimes as far as 60 miles in front of his head-quarters; and it is said that the Emperor Napoleon stated, that this screen completely shrouded all dispositions of Prince Frederick Charles, while it is well known that the Prince, by means of his cavalry, was fully conversant of all the general movements of his enemy. Guided by this information, the Prince, directing General Steinmetz to move on Metz, moved himself on Pont-à-Mousson.

General Steinmetz was ordered to march to Metz. As soon as the defeat of Marshal MacMahon at Wörth had been assured, the whole of the French Army began to fall back, and the left wing to concentrate towards Metz. General Steinmetz was ordered at once to push forward along the main road towards Metz. Prince Frederick Charles moved forward to Pont-à-Mousson, and the Crown Prince gradually pushed forward to Nancy.

On the 14th August, General Steinmetz attacked the French rearguard in front of Metz, and held, in consequence, the whole of Marshal Bazaine's Army in check, and prevented its retreat beyond Metz. On the same night, the cavalry of Prince Frederick Charles crossing the Moselle above Metz, threw its vedettes on to the road by which Marshal Bazaine must retreat from that fortress, in order to concentrate with Marshal MacMahon at Chalons.

On the morning of the 15th, the French General Forton was sent to clear this road, but found that the hostile cavalry had stretched a cordon there, and threatened to envelop the army of Marshal Bazaine in its meshes. To drive away these horsemen the French opened an artillery fire, which naturally did little execution among the isolated vedettes, while the supports were hidden in the indentations of the ground. During this artillery action the Prussian horsemen observed what they required. It is of course easy now to perceive that if General Forton had pushed forward boldly, he might have swept their unsupported cavalry away, but he could not, from the want of knowledge of outpost duty among his cavalry, tell what was before him, and the consequence was that the Prussian cavalry held its ground in the vicinity of Mars-le-Tour.

While the cavalry moved and held the French in check, Prince Frederick Charles was able to bring up two *corps d'armée*, and on the night of the 15th and the early morning of the 16th he threw them right across the road by which Marshal Bazaine wished to retreat on Chalons to join Marshal MacMahon. It was the result of these movements that brought on the battle of Vionville, which was the most important battle of the war, as far as the "tactical action" of cavalry was concerned.

Marshal Bazaine had determined to march early in the morning of the 16th August. The cavalry of General Forton was to move at 5 a.m. to lead the march, but something apparently delayed the French movement, and a countermand arrived at 9; and although the enemy's vedettes were known to be close at hand, it seems to have been totally unsuspected by the French staff that a strong force could be ready to bar a way. The cavalry unbridled, and, what can be hardly comprehended, with the enemy's vedettes so close, even took off their saddles. Some troopers were sent out as outposts, and the Officer in charge of them twice reported that considerable numbers of Prussian artillery and cavalry were approaching. A staff Officer was sent to examine these, but reporting that nothing serious impended, orders were given for three squadrons of each regiment to retire out of sight, while the fourth remained on guard.

While these squadrons were at ease, four Prussian horse artillery batteries, with two cavalry regiments, galloped up and opened fire. The French cavalry were suddenly disturbed by the German shells. They were quite taken by surprise. Forton's dragoons lost their heads, threw themselves on to their horses and fled, and the Officers could with the greatest difficulty get together a few troops. The result of this panic was, that the two cavalry regiments which accompanied the Prussian horse artillery batteries were able to force back two cavalry divisions, consisting of two regiments of cuirassiers, four regiments of dragoons, and two regiments of chasseurs, as far as Villers aux Bois. The French cavalry cannot be accused of want of courage; courage of the highest order they universally exhibited during the campaign, but on this occasion, by remaining quietly on the defensive, they allowed themselves to be surprised and thus lost their heads. Had they, instead of remaining calmly on the defensive, sent forward

even a few troops to make a dashing movement in advance, they would have discovered that their enemy was in much weaker force than themselves, and could have been driven off. This is an example of the old rule which has so often been laid down, that cavalry should never unsaddle or go to rest, till it has thoroughly cleared its front and reconnoitred all ground from which a blow can be struck against it.

Soon afterwards, the Prussian infantry of the 3rd corps came into line against the French left; and Bataille's division of the second French corps began to be severely pressed by the 6th Prussian infantry division; two squadrons of French Lancers were sent forward, apparently to attempt to silence the Prussian batteries which supported the 6th division, but were forced to return under the fire of the Prussian skirmishers. General Desbaux's cavalry division of the Guard was near at hand, so General du Preuil received orders to charge with the two Cuirassier regiments of his brigade. He remarked that the distance to be traversed before reaching the enemy's infantry was too great to allow the charge to be successful, and begged that artillery might at least to some degree prepare his attack. "Charge at once," said General Froissard, "or we are all lost," and the Cuirassiers rattled forward in three echelons, as if on parade. As the cavalry General had foreseen, the attack failed. The brave horsemen came upon unperceived obstacles of terrain, horses were in great numbers shot down, and while impeded under a heavy fire, were charged by Prussian hussars, who drove them back fighting, almost to the very position of Marshal Bazaine in person. Two fresh French squadrons here fell on the hussars, and saved Marshal Bazaine from capture.

To disengage the Prussian hussars, who were severely pressed, it was necessary to send forward the 6th Prussian cavalry division, which did disengage the hussars, but pushing on came into such a terrible fire at 500 paces distance from the intact French infantry, that it had rapidly to retire. This engagement occurred south of the main road.

Between 2 and 3 p.m., north of main road, the Prussian brigade Breslow, consisting of three squadrons of 7th Cuirassiers and three squadrons of 16th Uhlans, received orders to attack the French artillery near Rezonville, in order to give relief to the Prussian infantry, which was suffering severely from these batteries. It was a most dangerous duty which these squadrons had to perform. They rode forward exposed to heavy artillery and infantry fire, but carried the guns, cut down many gunners, and passed beyond the batteries. Here they were fallen upon by the two French cavalry divisions of Forton and Vallabrégne, and a desperate *melée* took place in which the Prussians suffered very severely. But their charge had the desired effect, for after the *melée*, the French cavalry had to retire to restore its order, and an attack which was being prepared against the left flank of the 6th Prussian infantry division, and which threatened to be very dangerous, had to be abandoned. In this case the Prussian cavalry, though it suffered very severely, was not uselessly sacrificed.

With reference to this *melée*, Colonel Bonie says that the French suffered much less than the Prussians. They used the point, while the Prussians cut, and it was found in the *melée* that while those who

cut, only wounded the horses, and could not injure the men protected by cuirasses, those who pointed killed the men through the interstices of the cuirass. This is not a new experience. So long ago as the time of the Peninsular war, Marshal Marmont recommended to the Emperor Napoleon 1st that cavalry should be armed with three-edged swords, so as to make cutting impossible.

Another serious cavalry contest occurred during the battle, brought on apparently by an attack of some French squadrons on a Prussian battery near Mars la Tour. Both sides were gradually reinforced, till six Prussian regiments and eleven French were engaged hand to hand.

These were not all the cavalry engagements of the day. On the Prussian side there were 22 regiments in the field, of which 19 took part in the various charges; the French brought 28 under fire, of which 22 were actively engaged. Thus about 25,000 horses were engaged. Eight times were there charges by the cavalry on both sides on artillery or infantry, in which the hostile cavalry came to the rescue, and twice there were serious hand-to-hand contests of large numbers of horsemen. For ten hours the battle continued, and some of the German regiments were seventeen hours in the saddle.

A French writer, speaking of this battle, says that it was by means of the action of his cavalry that the enemy was able at the commencement to supplement his numerical inferiority by replacing the troops which were wanting by reiterated charges, which brought a period of forced quiet, and so allowed time for his reinforcements to arrive.

When we consider that Prince Frederick Charles, by means of the action of his cavalry, was enabled to hold in check for the greater part of a long summer's day the whole of Bazaine's Army, 180,000 strong, with only 24,000 infantry, it must surely be acknowledged that the effectual action of cavalry, even on the very field of battle, is not, despite modern inventions, a matter of the past, as some are prone to argue.

Critics on this battle have said that the cavalry on both sides attacked at too great distances, and so took too much out of their horses before the final close; but it must be remembered that the ground was particularly open, and gave little opportunity for unperceived approach. It has also been said that both sides attacked infantry and artillery which had not been previously well shaken by the fire of the latter arm; but the Prussian cavalry had by self sacrifice to compensate for the absence of the other arms, and the French had at all price to break through, before the arrival of these arms, so that there was little time on either side for a scientific display of artillery fire. The rule is doubtless good, but the exception may be allowed under exceptional circumstances.

Colonel Bonie draws considerable attention to the superiority which the Prussian cavalry gained in hand-to-hand contest over the French, from the excellence of their horses. The Prussian horses are excellent and very well bred.

There was a large number of establishments throughout the country for breeding cavalry horses. The sires were also available for farmers in the district, on the condition that their foals should be available for military purposes, if required, at a certain price. The French light

cavalry were generally mounted on Arabs. As a rule, these Arab horses were found in the *melées* to be too small and too light to resist the great onset of the Prussian attack. There is no doubt, as German and French critics on this battle remarked, that the Prussian cavalry always had a great moral effect from the size of the men and horses. Still it appears to have been supposed that the Prussians always employed heavy cavalry in this encounter. That was not the case. The Prussian Dragoons were light cavalry, only the Prussian light cavalry were almost as heavy as the French heavy cavalry, except the Cuirassiers and the Carabineers.

Colonel Bonie thinks that heavy are better than light cavalry. Doubtless in the shock it has greater weight and greater moral effect.

The battle of Vionville was succeeded in two days by that of Gravelotte.

Gravelotte was almost entirely an infantry battle, except in the single instance, when a French cavalry regiment came into play. A regiment of Chasseurs in a charge was stopped by a wall, was held there under infantry fire, and lost an enormous number of men and horses.

The result of the battle of Gravelotte was, that Prince Frederick Charles, being supported by the King, threw back Marshal Bazaine into Metz, and surrounded him there. As soon as this was accomplished, Prince Frederick Charles was left with his Army to surround Metz, and watch it till it fell, which it did in October. During the investment of Metz, cavalry were of little use. Three of his cavalry divisions were therefore taken from him, and sent to the Army of the Crown Prince. The Crown Prince, during the time that these actions of the 16th and 18th at Vionville and Gravelotte were going on, halted at Nancy, and during this halt Marshal MacMahon gained several marches from him, and the Prussian cavalry lost sight of the French. As soon as the Army of Marshal Bazaine was securely invested in Metz, the Crown Prince set out from Nancy, in order to follow the Army of Marshal MacMahon to Chalons.

On the 16th of August the Crown Prince had reached Nancy, and halted there till after the battle of Gravelotte. He then advanced. After the battle of Wörth, the Armies of Marshal MacMahon retreated on Chalons. They were there reorganised and recruited by the levies of recruits that could be hurried up from Paris and from the various provinces of France. Thirty-three cavalry regiments were given to this new Army, of which fifteen were light. The Marshal was determined to relieve Metz. The idea was that he should move from Chalons on Rheims, by Rethel, Mezières, and Sedan, down to Thionville, leaving the Army of the Crown Prince well to the south. On this march the French cavalry seem to have been of as little use as vedettes as they had been before Weissenburgh.

One Cuirassier regiment and three regiments of Chasseurs, were on the right flank, two of Hussars were sent to the passage of the Argonnes; the other regiments marched compact with their corps.

The halt at Nancy had delayed the Crown Prince's cavalry, and

they had lost MacMahon; when the Crown Prince was at Ligny his cavalry discovered his line of march, and never lost it again.

Marshal MacMahon moved by Rheims, Mezières, Sedan, with Thionville as his object. He could learn nothing of the enemy's movements, but at every step his army encountered hostile vedettes, and even little groups of five or six horsemen, who appeared and disappeared incessantly, but always without the possibility of attacking them. The French cavalry always marched without reconnoitring. Once a strong force approached a wood in which were Prussian dragoons dismounted, and was only saved because the latter fired a little too soon.

It is said that on this march the Emperor's own household was sent forward to take up quarters for him. A few days before the battle of Sedan they arrived at the top of a hill, and were moving down quietly with an escort of the Cent Gardes towards a village where they intended to pass the night. As they approached the village an old woman came out and met them. They asked her what troops were in the village, expecting to find some other French cavalry were there, on which she told them the Prussians were there. That was the first intimation they had that the Prussians were within half a mile of them. Almost at the same moment that they obtained this information, the Prussian shells opened upon them, and they with difficulty retreated without capture.

When the Crown Prince found the direction that Marshal MacMahon had taken, he altered his march, which had been directed on St. Menehould, to Sedan. He turned his army, which had been directed to move along the Marne towards Paris, and struck across the country towards Sedan. At the same time the army of the Crown Prince of Saxony, consisting of three *corps d'armée* and one cavalry division, was detached from the army of Prince Frederick Charles, and hurried across the country in order to head Marshal MacMahon as he came down towards Thionville, while the army of the Crown Prince should attack him in flank. On the 30th of August the Crown Prince of Saxony again surprised the French at the village of Mouzon. On the same day the Crown Prince surprised them at Beaumont. In neither case were the outposts properly secured. Of course the Prussian advantage, and the means by which they could conceal all the movements of their infantry, in order to strike their sudden blows, were entirely due to the information which was brought in by the cavalry vedettes. The fifth French corps was almost entirely overthrown, and when it was being rapidly annihilated, again the French General sent forward a Cuirassier regiment to attempt to save it. They engaged in a vain attempt, their horses were shot, they themselves were dismounted, and the whole regiment was nearly destroyed, and, of course, could have very little effect in averting the impending ruin of the infantry. On the 30th of August, that same night, the retreat commenced upon Sedan in great disorder.

During the retreat the following day, the reiterated attacks of the Prussian cavalry spread a panic and disorder among the French. The French cavalry, instead of covering the retreat, moved compactly with the infantry corps to which it was attached; instead of disputing the

ground and reconnoitring the enemy, they were generally in front of the infantry, offering an obstacle to its advance.

So bad was the information which the French cavalry brought in that Marshal MacMahon, in falling back on Sedan to fight, thought he had only 60,000 men behind him, while in reality he had 200,000. If his cavalry had been able to do their duty better, instead of falling back towards Sedan, he might perhaps have crossed the frontier, and so avoided the catastrophe that occurred at Sedan.

During the actual battle at that place, two great cavalry charges were made by the French with great bravery, but too late, and without proper precautions. The cavalry went forward, but only again to add to the hecatomb of wounded and slain.

The consequence of the catastrophe of Sedan was that the Crown Prince was able to invest Paris, and during the next few weeks, the war was a war of sieges. Prince Frederick Charles was investing Marshal Bazaine in Metz, and the Crown Prince, General Trochu in Paris. The cavalry could not be employed largely. The Prussian cavalry covered the siege, and scoured the country everywhere.

After the fall of Metz, Prince Frederick Charles marched rapidly in order to cover the army besieging Paris from a contemplated attack from Orleans. But before the Prince arrived, this army had been held in check by two divisions of cavalry alone. They never came to any serious encounters, but, by cutting off vedettes, and always surprising the French whenever they approached any village, they kept them in a constant state of fidget, until time was given for Prince Frederick Charles to come up and put about 80,000 men between Orleans and Paris. The French cavalry, which had been the cavalry of the army at the commencement of the war, was entirely ruined by the capture of Metz and by the capture of Sedan. A few regiments escaped from Sedan, but they reached Paris in such a demoralised state that they were hardly able to take the field. The Prussian cavalry continued the war in the same way, always active and always vigilant. The French cavalry was not able to compete with it. Gradually, the Prussians finding there were no horsemen to oppose them, became bolder and bolder. At the battle of Orleans several instances occurred in which the cavalry rode right into the infantry, and in one instance a cavalry regiment of Prussian hussars suddenly dashed forward and captured a whole French battery, with the gunners and horses, and drove it into their lines. During the remainder of the war the Prussian cavalry was active, ubiquitous, intelligent; it saw everything and announced everything. The French cavalry was ruined, and there was no means at the moment of supplying its place. Hasty levies were of little good.

I have endeavoured to put forward as succinctly as I can the general features of the cavalry actions during the campaign. I only wish now to lay before you a few deductions which I have collected from various books and writings which have appeared lately, both on the subject of this war and others.

It appears that since the invention of rifled arms, cavalry must act at greater ranges in front, and on the flanks of an army during the operations before and between the battles, and that a larger force of

cavalry than formerly must be maintained. There should be two distinct modes of employment of cavalry, first, as cavalry attached to infantry, and, second, cavalry in divisions. In the Prussian service there are about one horseman to every twenty infantry, to do the duty of outposts; one horseman to every twenty men in the army to do the duty of the divisional cavalry. Cavalry should be organised so as to be mobilised with extreme rapidity in case of war. It should have normal depôt squadrons formed in peace, and means should be taken to insure the power of obtaining horses with great rapidity. Cavalry should be told off in peace to accompany infantry. Officers should be well instructed in reading maps, knowledge of country, and outpost duty during peace. During the Prussian manœuvres, though the troops rested at night, the Officers who were in charge of the outposts were expected to be alert and vigilant all night, so that the commander of the division coming on the ground next morning expected the outpost not only to tell him where the enemy was, but what forces of different arms were lying in the different villages along the line of his outposts. Next, as cavalry must move far in advance of infantry, there must be means of sustaining it independently of the ordinary commissariat. The Prussian cavalry during the war used the system of requisitions. Their advanced troops went into the farms and villages and took whatever hay and corn they wanted. Of course, in a less fertile country than France such a system would be impossible, and the only way it could be compensated for would be by having some system of light waggons attached to the cavalry, or by the troopers carrying their supplies themselves. Cavalry must move over great distances rapidly. All weight that can possibly be taken off the horses should be diminished. From various accounts of the late war, most of the critics on cavalry-matters seem to hold it as extremely advisable that the man should be as heavy as possible, because he uses his weapon with so much more advantage in a close hand-to-hand contest; and some have proposed that the only way to lighten the weight on the horse, and still to retain a heavy man, is to abolish the pack altogether, and the heavy saddle which is required to carry the pack. They argue that in these days of railways, an army never moves far from its line of communication, and that it never can move above three or four days, constantly keeping in motion; that there is plenty of time during the various halts to bring up the baggage; and even if there is not, that the men, if properly equipped, ought to be able to go six weeks without any change of clothes, or without any re-adjustment of equipment. Several writers are especially loud in declaiming against dismounted men being attached to cavalry regiments. They hold that dismounted men, when cavalry are really acting far to the front, could never be up in time to be of any use. As concealment is very necessary, several writers have urged that head collar chains, and steel scabbards, and everything that glitters in the ranks of cavalry, should be abolished; that all burnishing should be abolished, and that spurs and stirrup irons should be browned like gun-barrels. Others assert that as men must now ride for very long distances, sometimes forty or fifty miles, generally at a trot, they should be permitted, except when on parade, to rise in their

stirrups. Then, they assert that cavalry should never encamp, if possible, but always take up quarters, and if surprised in their bivouacs or quarters, defend their horses on foot with their firearms. They think that reconnoitring cavalry should act individually, or in small groups, and that, for tactical purposes, the cuirass should be much more largely introduced into the service.

The CHAIRMAN: I think everybody will agree with me that a clearer account of a campaign has never been given than that which has now been given by Captain Hozier. It is the more gratifying to me as an old cavalry Officer; and we need be under no despair about our arm, about which some persons say that it is now of no use at all. In the campaign just described, cavalry have taken their part, just as distinctly as they have done in previous campaigns. I do not think it is possible for any misgiving to be entertained about the use of the arm after the account that we have heard. It is very clear that when cavalry are under proper discipline, properly looked after, and properly commanded, there is no reason to doubt for a moment, that we shall maintain our ground in any future campaign as effectually and as usefully as we have done in past campaigns.

Evening Meeting.

Monday, April 8th, 1872.

REAR-ADMIRAL A. P. RYDER, in the Chair.

NAMES OF MEMBERS who joined the Institution between the 19th March and the 8th April, 1872.

LIFE.

Northbrook, Right Hon. Lord, Viceroy and Governor General of India.
Dennistoun, R. J. W., Lieut. 64th Regt.
Graham, Cyril, Esq., late Governor Red River Settlement.

ANNUAL.

Reamsbottom, Alfred, Lieut. 82nd Regt.
Loder, F. C. J., Lieut. 82nd Regt.
Boycott, William, Major 29th Regt.
Deering, Charles L. H., Lieut. 28th Regt.
Smith, S. Milne, Major late 3rd W. York Rifle Volunteers.
Law, E. F. G., Lieut. R.A.
Gawler, John Cox, Colonel 73rd Regt.
Chichester, Sir Alexander P. B., Bart., Lieut Devon Yeo.
Stephenson, Charles, Captain 22nd Middx. Rifle Vols.
Trench, Hon. C. G., Captain 1st Royal Dragoons.
Gordon, Alexander W., Lt.-Col. 61st Regt.
Hickson, Robert A., Lieut. 3rd Buffs.
Murchison, K. R. Esq., formerly of the 13th L. I. and 58th Regt.
Hammick, St. V. A., Capt. 43rd L. I.
Quick, George, Esq., Engineer R.N.
Cooper, William, Lt.-Col. 70th Regt.
Davidson, John, Esq., Master Royal School of Naval Architects.
Stock, H. J., Capt. Bombay Staff Corps.

A METHOD OF CONVERTING THE REGULATION BELL TENT INTO A SHELTER TENT: WITH A NEW ARRANGEMENT FOR ENTRENCHING TOOLS.

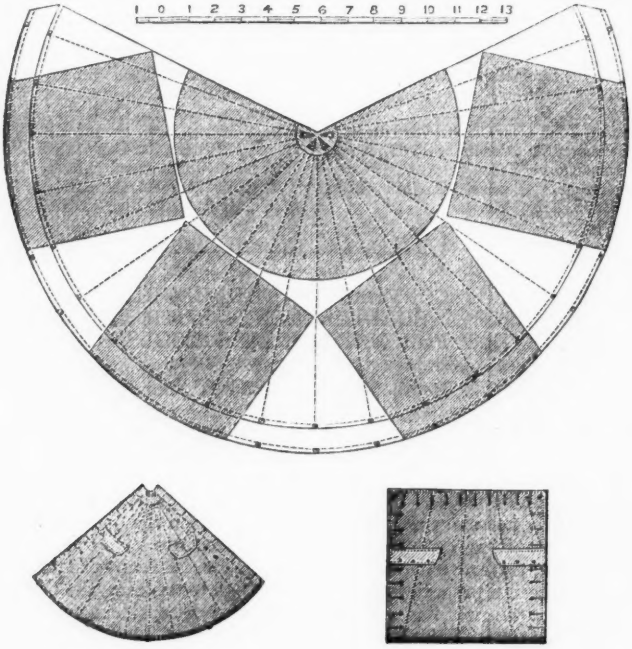
By W. JAMES, Esq., late 42nd Highlanders.

THE proposal which I am about to bring before you, and which has to do with the question of shelter-tents and entrenching tools, is made from motives of economy. My shelter-tent is composed of six pieces of canvas, and I propose to show how it can be cut out of the bell-tent. It is hardly necessary for me to say much upon the question of the shelter-tent. It is a subject which does not seem to have occupied the attention of Government with regard to the British Army of late years; there has been a prejudice against it; but on examining the bell-tent, I think that you will find my proposal worthy of consideration.

The bell-tent is a very ancient institution of the British Army, and

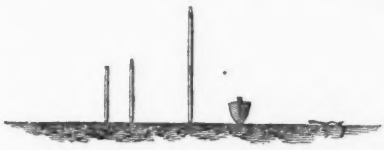
no doubt it has been modified a little from time to time. It is my opinion that the time is come when it may be further modified, and I think that my plan will contribute to that result. The bell-tent costs about £3 10*s.*; and if it cost that sum and nothing more, we might be content with it. But that is not all; the carriage of it increases its cost seven or eight times. These are economical times; but I trust that they are efficient times also. If you can combine efficiency with economy, then, I think, the question is settled. Now, I undertake to combine efficiency with economy.

I think I have shown that the bell-tent is not economical. Now let us see whether it is efficient. I admit that it is a very good tent, if you can have it when you want it; but it cannot always be at hand when it is required. In the case of a regiment marching along a good road, or where you can get your pack-animals to keep up with the regiment, you can get your bell-tents up; but even then there is a considerable amount of delay in the matter. But supposing you are going over ground impassable to animals or carriages, what are you to do then? You have to bivouac. Now bivouacking in fine weather is not at all an unhealthy thing. But still you have no shelter should it be required. Therefore you see the bell-tent is not sufficient, because it cannot always be had



when it is wanted; and, as I have said before, it is not economical. I now undertake to do away with the bell-tent as it stood, and to substitute another from its materials. I proceed to cut the two ends; to cut off its head; and I then take the four sides, and I make what the French call a *tent d'ábri*. I know that there is a prejudice against shelter-tents, although they have never been used in the British Army, except on one occasion, when they were used by General Eyre's division in the Crimea, as an experiment. They are objected to in consequence of the weight, &c. But I think you will agree with me, that if I can undertake that this shelter-tent shall be every bit as comfortable as the bell-tent (taking into consideration the time the men must be without tents) that, as a matter of economy and efficiency, it will be a very good substitute. With regard to the question of cost; my proposed "shelter-tent," taken out of the "bell-tent," will only cost a trifle, because you have the canvas already; you have merely to cut it in the way I have shown, to fit buttons and button-holes, and cut two slits. I calculate the cost to be about 12*s*. for the whole tent. The carriage of it costs nothing, because the men carry it themselves. Every man carries a piece; and as regards the comfort of it, you will agree with me that a tent of some sort is better than no tent at all, because, as in the case of the bell-tent, the men are often obliged to do without it at all.

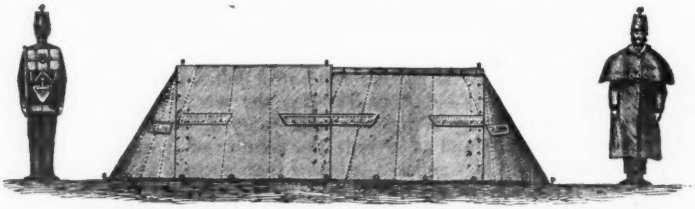
I now come to the question of "entrenching tools," an answer to which is the great want of our times. This also is really a question of shelter. Now there are two kinds of shelter; shelter from the weather, and shelter from the missiles of the enemy. I provide entrenching tools for this second form of shelter. Having got the poles for the shelter tent, I fit them with tools for entrenching. These tools consist of a spade and a pickaxe. Possibly, gentlemen connected with the



Army, who know what the present entrenching tools are, will say that my plan is impossible. I think the contrary. My object is, that not only the tent should be carried by the men, but the tools also; because if the tools are carried in carts, the men may have to wait for them when they most need them to throw up cover, and may suffer seriously in consequence. Here I show a spade, a shovel, and a pick. This is the regulation shovel, this is the regulation pick, only reduced to a weight and size so that they can be carried by the men. I use the tent-poles as handles for the tools. The question of fixing them may appear a difficulty, but there is no real difficulty in the matter. The upper pole of the tent I fix into the shovel with a bolt, and it is quite strong enough for the purpose. The pick is put over the end of the

other pole, which is rather thicker at one end, in the usual way of picks, and it can be taken off when required.

Now, with regard to the weight which the soldier will have to carry, I find on looking into that admirable book by Sir Garnet Wolsey, "*The Soldier's Pocket Book*," that the weight for the British soldier to carry has been reduced to 40 lbs. 9 oz.; this does not include the blanket, which has to be carried for the men. My plan is to do away with carriages altogether; not to have a single cart or horse; but I cannot do without the men's blankets, the men must have their blankets. I therefore do away with the great coat, and I convert these half-canvas tents into great coats for the men. Now, each piece of



canvas weighs 4 lbs. as compared with the coat which weighs 5 lbs. 14½ oz. I acknowledge that the warmth of the canvas is not equal to that of the great coat; but, as I allow a blanket, I think the two together will pretty well balance the warmth of the great coat. I thus take away 5 lbs. 14½ oz. from the weight of the kit, and I put in exchange 4 lbs.; therefore, I make the kit lighter by 1 lb. 14½ ozs. The men, however, have to carry the tent poles and the entrenching tools. The tent pole is about 1 lb.; the entrenching tools should not be more than 3 lbs. at the outside; I hope to get them less. This addition will make the kit about 3 lbs. more than the present weight. Then, again, the kit includes 70 rounds of ammunition; but if you provide the men with entrenching tools, with the means of throwing up shelter against the fire of the enemy, so much ammunition will not be required, and you may reduce the ammunition by 20 rounds, which weighs 2 lbs. In that way I get my kit down to the amount that the soldier at present carries, about 40 lbs. 9 ozs., but with the blanket in addition, which, on a short expedition, can be balanced by leaving out the extra pair of boots at present carried by the soldier. In conclusion, I may state that the cost of the carriage of the bell tents and entrenching tools for a regiment 800 strong, is about £4 per day, making for a three weeks' manœuvring about £80. Now, the cost of converting 100 bell tents at 12*s.* each, and 302 entrenching tools (the number at present allowed to a regiment) at 1*s.* each, would be £76. Therefore my plan shows an immediate saving of £4, and in future the entire cost of carriage would be saved, besides conferring, in my estimation, an immense benefit on the soldier.

Present field kit.	Weight.	Proposed by Lieutenant James.	Weight.	No. of men.	Number of men to shelter tent, articles, and weight carried by each.	Weight.
	lbs. oz.		lbs. oz.			lbs. oz.
Valise and straps ..	3 1	Valise and straps ..	3 1	1.	Portion of tent, 1 blanket, ammunition (50 rounds), accoutrements, water bottle, pickaxe and handle, valise packed, three days' provisions, rifle, bayonet, scabbard, mess tin	48 0½
Pouches	1 11	Pouches.....	1 11			
Waistbelt and frog..	0 14	Waistbelt and frog.	0 14			
Ammunition (70 rounds)	7 5	Ammunition (50 rounds)	5 3			
Rifle.....	9 0¾	Rifle.....	9 0¾	2.	Portion of tent, 1 blanket, ammunition (50 rounds), accoutrements, water bottle, shovel and handle, valise packed, three days' provisions, rifle, bayonet, scabbard, mess tin	48 0½
Bayonet	0 13¾	Bayonet.....	0 13½			
Scabbard.....	0 4½	Scabbard	0 4½			
Knife and lanyard..	0 5	Knife and lanyard .	0 5			
Water bottle	3 10	Water bottle.....	3 10	3.	Portion of tent, 1 blanket, ammunition (50 rounds), water bottle, accoutrements, pickaxe and handle, valise packed, three days' provisions, rifle, bayonet, scabbard, mess tin	48 0½
Mess tin	1 5½	Mess tin.....	1 5½			
Great coat	5 14½	Tool and handle ..	4 0			
1 shirt.....	1 1½	Share of tent.....	4 0			
1 pair of socks	0 4½	1 shirt	1 1½	4.	Portion of tent, 1 blanket, ammunition (50 rounds), accoutrements, water-bottle, shovel and handle, valise packed, three days' provisions, rifle, bayonet, scabbard, mess tin	48 0½
Towel	0 8	1 pair of socks	0 4½			
Spoon	0 1¾	Towel.....	0 8			
Comb	0 0½	Spoon.....	0 1¾	5.	Portion of tent (end), 1 blanket, ammunition (50 rounds), accoutrements, water-bottle, hatchet and handle, valise packed, three days' provisions, rifle, bayonet, scabbard, mess tin, spare grease, 1 lb.	48 0½
Brush	0 3½	Comb	0 0½			
Pot of grease	0 4	Blanket	4 0			
Housewife	0 3	Glengarry cap	0 4	6.	Portion of tent (end), 1 blanket, ammunition (50 rounds), accoutrements, water-bottle, hatchet and handle, valise packed, three days' provisions, rifle, bayonet, scabbard, mess tin, 2 brushes, 2 housewives, 2 sponges, 1 lb.	48 0½
Sponge	0 0½					
Boots	3 3	Total	40 8½	7.	Waterproof sheet, 1 blanket, ammunition (90 rounds), accoutrements, water-bottle, valise packed, three days' provisions, rifle, bayonet, scabbard, mess tin	48 0½
Glengarry cap	0 4	3 days' provisions..	7 8			
Account book.....	0 2	Grand total	48 0½	8.	Waterproof sheet, 1 blanket, ammunition (50 rounds), accoutrements, water-bottle, valise packed, three days' provisions, rifle, bayonet, scabbard, mess tin, camp kettle, 3⅜ lbs.	48 0½
	40 9					

The CHAIRMAN: Would any gentleman like to ask any questions or to make any remarks?

Captain COLOMB, R.N.: I wish to ask whether the lecturer intends to substitute his *tent d'abri* entirely for the bell tent?

Mr. JAMES: I should hope not entirely. There is no necessity to make it out of the bell tent; only as we have the bell tent already, as a matter of economy I propose to utilise it in the way I have mentioned. You see it exactly fits into my plan, although not intended to do so originally.

A VISITOR: Is it intended that the soldier should carry his tools with his tent?

Mr. JAMES: There are entrenching tools at present provided, which are carried in a cart, and the carriage of those entrenching tools comes to about a guinea a day. My plan is for the soldier to carry his own entrenching tools, not only because it is more economical, but because it is more efficient. When they are carried in a waggon you do not know where they may be. Being obliged to carry two poles for the *tent d'abri*, I utilise them as handles for the entrenching tools. These tools have been tried, and a similar system (I will not say the very exact plan) to this has been tried; but I have used a spade of this sort, and found it to answer. The weight is a little more than I should like it to be.

The CHAIRMAN: Is your *tent d'abri* about the size of the French tent?

Mr. JAMES: Yes, two of the square pieces without ends are. The French tent is open.

The CHAIRMAN: How many men will your tent hold?

Mr. JAMES: This, with the addition of two more centre pieces, accommodates eight men. The eight men who occupy this shelter tent require no carriage of any sort, neither horse nor cart. Though I cannot undertake that they should carry the tent and tools through a whole campaign, yet for the autumn manœuvres by this system there would be no expense of carriage at all.

A VISITOR: In the event of one of the men meeting with a casualty, what then?

Mr. JAMES: Unfortunately, in that case it is impossible for me to tell. But the two ends form a tent for two, and the two centre pieces form a tent for two without the ends, like the French tent exactly. My plan provides a tent for eight, five, or two men.

Commander GILMORE, R.N.: I would ask a question as a mechanic. The strength of a thing is not stronger than its weakest part. Supposing one man breaks down, the man who carries the centre part?

Mr. JAMES: Then, of course, the tent can be used as a tent for five, or for two, or for eight.

Captain GILMORE: Would the connecting parts be buttoned?

Mr. JAMES: Yes, buttoned together. Here is a tent for five, here is a tent for eight, and putting these two ends together, it is capable of holding two, being six feet in diameter.

Captain GILMORE: Would it not be equally well for the man who carries this tent to put his back against the wind, and spread his portable clothes over him?

Mr. JAMES: He can spread his tent over him if he likes. I do not want the man to get under the tent if he does not like; but what I say is this, here is a tent for him if he likes to use it.

A VISITOR: Supposing a man has to go on sentry, what is he to do without a great coat?

Mr. JAMES: He can put on this portion of the tent, which acts as a great coat.

The VISITOR: Then the tent would be incomplete.

Mr. JAMES: Then five men can make use of the remaining parts, and fix a tent for five.

The CHAIRMAN: I beg to tender the thanks of the meeting to Mr. James for this explanation of his system.

H.M. SHIP "AGINCOURT" ON, AND OFF, THE PEARL ROCK.

By Commander R. H. Boyle, R.N.

The circumstances connected with the grounding of Her Majesty's ship "Agincourt," on the Pearl Rock, have been spoken of as interesting to the service at large; I therefore, as a partaker in the operations, have ventured to come before you, to describe as clearly as I can the different steps taken from the time of the mishap until that happy moment when she was again afloat, and I must begin by asking your lenient judgment for my effort, which I am too well assured will fail to do justice to the event.

Before I proceed to details, let me remind you that the "Agincourt" during her commission, had borne no trifling or unimportant part in the services of the home station during the two preceding years. Indeed, I question whether before, any ship belonging to Her Majesty's Navy had attained so familiar a place on the lips of the world at large; from her cradle, to the time at which it was too hastily assumed by some casual observers that she had finished her span, and was to remain on the Pearl Rock, her movements have been watched with interest. From the day on which I saw her massy hull floated out of the dock at Liverpool, up to this very day on which I address you, she has been an object of interest,—first, as most formidable; then, as being the fastest ship of the whole Navy (she went 15·4 on her first trial); later on as carrying the Admiralty flag on two occasions in the van of a fleet, whose power was unprecedented; between those two occasions employed on an operation of great interest and responsibility, viz., the towing of the "Bermuda Dock" the most dangerous part of that voyage (this in happy combination with her sister vessel "Northumberland"); afterwards, and even now, flying the flag of an Admiral second in command of the Channel squadron: these are the landmarks of her career, and I venture to say she has become and is still likely to continue deserving of praiseworthy note.

In this description I intend entirely to confine my observations to the operations *consequent* on the ship taking the ground. To revert to the discussion which the court-martial has already decided, would be unnecessary and improper; and I will at once ask you to follow me and picture to yourselves the surprise with which we were all taken when in the middle of the forenoon of that 1st July, the stoppage of the way of the ship indicated the nature of the accident. The weather was lovely; sea perfectly smooth; the speed of the ship little more than a couple of knots; there was no shock to tell us of the occurrence; no apparent heel of the ship. Indeed, as far as feeling was concerned, there was nothing to tell the tale, save as we afterwards heard from a couple of stokers employed in closing the man-hole doors into the double bottom under the stoke-hole, and these men, employed imme-

diately above where she struck, felt the grating of the ship taking the rock, and experienced some small shock.

On deck, as I say, those in charge, at once observed the stoppage of the ship, and the engines were stopped and reversed. The leads which at the time were going in both chains, were cast to see what soundings could be got; without effect, however, for from the usual place of heaving no soundings could be obtained; nor was it till a cast from the starboard sheet anchor was taken, that the fact was realised that she was aground, abreast of the second mast, at about one-third of her length from forward. There 24 feet of soundings were obtained. The want of soundings elsewhere, showed that it was on a rock she had struck, and her draught of water of 26 feet 8 inches forward, and 27 feet 10 inches aft, made us aware that though the shock had been slight, yet it was not unlikely to be tough work to get her off.

No time was lost. The first step was to warn the next ship astern, the "Warrior," to sheer out of danger. Meanwhile, the signal was made to Vice-Admiral commanding "Am Aground," and the "Hercules" was at once ordered to close, and tender us all the assistance necessary. The boats of the squadron in company were ordered to be hoisted out and sent to us, and the Admiral himself was amongst the first who were on board the "Agincourt." Signals were also made to the "Inconstant" (left at Gibraltar, where she was awaiting the flying squadron), which acquainted the Captain of the port with the accident, and cautioned him of the necessary steps to be taken. Shortly the squadron were ordered to anchor in Gretores Bay, and thus the "Warrior," "Monarch," "Northumberland," and "Minotaur" were within easy reach, and the "Hercules" at hand for towing purposes. The engines were moving astern at full speed; more boilers were lighted; and when a breeze sprung up about 11.30 a.m., sail was set aback.

The "Hercules," deterred by the tide from approaching us in the way best calculated to take our towing cables in, approached us with her bow towards our stern, and consequently a long drift was between the two parts to which the cables were directed. An 18½ hemp sheet-cable was sent from our starboard stern-hawse to her stern, and was secured, and the launches of the squadron were sent under our stern to carry the bight of the chain-sheet, the end of which was bent to a 9-inch hawser from the "Hercules" to her. That ship had meanwhile drifted further from us, and while engaged in this operation the only accident which occurred during the series of operations, took place. The long drift of cable caused our control of it to give way, and, slipping through the ring stoppers and lashings securing it, it took charge, and slipping or parting from the other boats, capsized the "Monarch's" launch, fortunately with no further ill result than an annoying wetting for the crew, and damage to the boat. Coming then with full strain on the hawser with which the "Hercules" was hauling it in, that to our chagrin, but hardly to our surprise, parted, and therefore the hemp cable was thus far the only attachment of the two ships.

High water was at hand, and there was no time then to take a cable across; so it was determined to try whether the hemp cable would be

sufficient, acting with our own engines and sail power. Not so, however, for almost at the first strain it parted, and we were thus able to realise how hard and fast the rock held us. Then began the work of clearing, a work which from that time was carried on until the ship was once more afloat.

The tide, which caused a rise and fall of about 2 feet, was taken advantage of, and it was at the top of high water that the successive efforts were made, whether by anchors laid astern, by steaming, or by towing.

I may here also ask you to mark the stages of our labour, which was carried on through Saturday, Sunday, Monday, and until the afternoon of Tuesday, when she floated. Thus far I have, of course, spoken of Saturday. On the afternoon of that day, the shot, shell, and powder were got out, partly into the "Pigeon" gunboat, partly into lighters. The starting of coal was also at once begun, into lighters first; but so much sea was there alongside, that it was necessary to start them overboard for part of the time. Guns were transported aft during that night and evening, and chain cables ranged abaft, in readiness either for towing or for a stern anchor. Provisions were being got up and out, and at midnight when it was again high water, full speed astern was again tried, without any effect however. The next day, Sunday, the highest tide was expected, and in anticipation of this the "Hercules" had dropped a bower anchor, and passed the cable to us. The stream chain was used by us to heave this in, and it was brought to the after capstan. When this anchor came to be hove upon, however, a sandy bottom prevented its holding in, and it came home. On Sunday night an anchor was placed on our port bow, and a hemp sheet passed in on upper deck, and hove taut; this was to prevent the ship swinging with her head any further in-shore. On this day also, it was found that pivoting round, the ship had grounded under the engines on the port side, and hung there about one-third further aft. In consequence the strain was taken off, greatly or in part, from the starboard side, but the first warning we had of the change of position was the noise of the straining beneath the after cylinder, where the outer bottom was started in, the transverse frame borne upwards, and the joinings of plating in the inner skin started.

Measures were at once taken to shore down these plates. A sheet of india-rubber, with a coating of cement beneath, was put over the crack, and baulks of timber placed and wedged on top of this beneath the cylinder. The compartment of double bottom, which was thus bilged, was capable of holding about 150 tons of water, and to that extent water was necessarily admitted to the ship, but kept confined to this water space. As a proof of the size of the crack through which the water was admitted to this space, I may mention the fact that a fish, the size of a large sardine and of the rock cod species, was drawn into and afterwards found in the double bottom.

Coals and stores continued to be started and removed throughout Sunday night, and on Monday morning the hoisting out of the guns, carriages, and slides began.

The anchors and cables, with the exception of one sheet, were

removed during that day by a party from the "Hercules," the guns, &c., by our own ship's company, aided, right loyally, by working parties of fifty men from four ships of the squadron, who had come on board the previous evening. On that day seventeen guns, with their carriages, and most of the slides were hoisted out, while at all other points, working parties were engaged in removal of all stores of every description; and while on deck a sufficiency were working the gun purchases, others were transporting and placing the guns, others hoisting coals from each of the twenty bunker-shoots along the deck and removing them to the port, anchors were being placed in lighters, cables being ranged and payed out, spars were got overboard, and later in the day when it was found that water had appeared in the bread room and slop room, which were situated in the compartment next abaft the engine-room, pumping parties had to be sent down to free those places of water and to clear them. Picture to yourselves, then, the craft, of whose condition so hapless a picture was drawn by Mr. Bland, whose letters, addressed to an anxious nation through the newspapers, placed us all unknowingly at the bar of public opinion.

Working by watches through the night of Monday, Tuesday broke upon us anxious, but confident that our labours were to be successful.

The "Hercules" was, after some trouble, enabled to place herself close enough to pass the chain cables from her stern to ours, using a large lighter to carry the end across. She had previously to weigh the anchor which had been used by us astern, and having after that let go her anchor at some distance off, backed into our stern, so closely indeed as to smash some of our stern work, but that, of course, mattered little when the object was so important, and the end so well attained.

During that forenoon we continued to hoist guns out, and here I may draw your attention to the paucity of lighters for this heavy work. Most of the vessels were coal lighters of slight scantling and in a shaky state, and had it not been for a good bedding of coal to land them on, we should have felt much hesitation in attempting to do so. One large and more strongly built craft we had, and indeed I hardly know what we should have done without her; and I may here point out that the lighter I mention belonged to Mr. Bland. It was upwards of 100 tons burden, and of much stouter scantling than the others, and carried six or seven guns with their carriages and slides easily.

Into some mud-flats with hinge-bottoms we had absolutely to put the guns, and I cannot tell you how glad I was to hear that these craft reached the mole in safety, without either depositing their present cargo at the bottom after their usual fashion, or from an endangered stability arising from a high placing of the weights, turning over in their somewhat long transit to Gibraltar.

The aid of our most admirable ally, the "steam capstan," deserves a mention here; but for it I am convinced that we should have had to wait a much longer time between each hoist of guns; but with a 6-inch messenger, or rather pendant, round it, there was a stern persuasion about it when applied to a 12-ton gun with its extra weight of carriage and slide which would not be denied. You who know the infinite

obstructions which the deck of a ship now presents with the present system of racers, can realise how we had some labour to get the monster weights transported about, and the watchwords were "Go ahead, or astern!" "Stop her!" "More soap!" "Where's the Jack?" &c., these last two somewhat mysterious appeals relating, firstly, to the soft soap which was found indispensable for the transport (it was sprinkled in front of the advancing gun, whose front part of slide was on a chock, rear, on trucks), and the "Jack" related to the hydraulic jacks which for all varieties of lifting were absolutely indispensable.

That last forenoon, besides other weights, we got out five more guns, and a good number of carriages and slides, two of the guns being 12-ton. When we ceased getting weights out at noon, there was little more that could have been done to lighten the ship. Six more guns with their carriages were on the main deck, the topmast and topsail yards were aloft, one anchor and rather more than a cable were left to us, two boilers only were filled, the others having been blown out some time back, and there was a small weight comparatively of Officers' baggage, none of which had been got out—altogether hardly more than 200 tons of gear.

And now, before I go on to speak of the final and successful effort, let me glance for a moment at the engine-room arrangements; and first let me say that the exertions of all concerned in this particular department were beyond any praise which I can venture to offer.

From the moment of the ship striking until that on which she was again afloat, there was constant labour, constant source of anxiety for those concerned in the engine-room work. Firstly, from the fear of any strain consequent on the grounding causing any of the pipes connected with boilers and machinery to start and become leaky. In the second place, from the fact that the ship was aground under the stoke hole, and there it was that danger might be apprehended. Thirdly, from the necessity of being at all times ready with steam, in the event of requiring to use the screw. And finally, when on the day following the mishap, the forcing in of the outer bottom caused the most serious alarm.

Then came the climax of the Engineer's exertions.

When the creaking and groaning of the ship grinding under the engines was heard, attention was at once directed to that part, and it was soon observed that the inner skin had been started up by the pressure of the frames beneath. Several rivets had started, the butts of some of the plates had parted, and the water was making its way through.

In combination with the carpenter of the ship, the engineers at once shored these plates down, and placing india-rubber sheets and cement made of iron filings, red lead, and spun yarn, the whole was screwed into its place by jacks and shored beneath the cylinder.

The double bottom arrangement extended no further aft than the after bulkhead of engine-room, and thus it was that the water extended to store rooms beyond that compartment; and some remarks on the supposed failure of the system of construction which met my eye after the event, induce me to call attention to the fact that the only reason the leakage was not entirely confined to this one space was, that to

this bulkhead were fitted sluice valves intended to run the water from the after part of the ship, in the event of leakage there, to the engine-room, where the bilge pumps of the engines could speedily pump it out.

One of these valves was found not to be tightly closed, the reason on investigation proving to be that the rod, which was a bent one and with bell-crank lever action, had become too long from constant opening and shutting. The valve, which was wedge-shaped, was thus found to be one-eighth of an inch from being home.

There were no sounding pipes to this bread room compartment, and, therefore, it was not till the bread and slops remaining in this compartment were drowned, that the leakage there was discovered. Then these places were at once cleared. The Downton pump and a fire engine were applied to pump them out, and to accelerate the operation several rivets knocked through from engine-room, which allowed the water to be run into the bilge, there to be pumped out by the engines (while the clearance went on, the water, of course, was gaining).

Let me here call your attention, too, to the trial made by the chief engineer, of the powers of the engines to keep the compartment clear. By loosening the manhole-door of the double bottom the water was allowed to run from the double bottom into the upper bilge, from which the main engines were enabled to pump it overboard. Four feet of water was admitted to the bilge, and the engines, which had been disconnected from the screw, were set to work at 40 to 45 revolutions. It was calculated that each revolution pumped out at least three-quarters of a ton. This was by injecting from the bilge, as well as by using the bilge pumps, and in ninety seconds, two feet in depth, or about 45 tons was pumped. After the trial the manhole was again closed and the water confined to the outer bottom. The engines were also used to pump the leakage out before the plate had been shored down.

The divers were employed from the outset of the operations, and on the whole their labours were most satisfactory, though they failed to observe the rock on which afterwards the ship swung—that on the port side.

Up to the time that the strain in the engine-room gave warning of the new point of danger, they had reported all clear, except at the first place of grounding—that on the starboard side. From this time, however, their reports proved most trustworthy, and their work below water, when the ship was off, was entirely successful, and could be little improved upon by the trained dockyard divers, who were sent out by the "Achilles" afterwards.

And now I will ask you to follow me in thought to the afternoon of Tuesday, when, having completed our towing arrangement, we awaited the highest point of the tide at about 3 o'clock. The work of hoisting out had been discontinued at about 1 o'clock. Lighters had been all sent away, and with the "Hercules" in tow astern, with two tugs fast on our port beam, and hawsers from starboard bow and beam, to a tug and a Spanish war steamer respectively, with everything in readiness

to connect the screw below when the ship should be afloat; all, from the Vice-Admiral to the smallest boy, awaited with interest the result of this which we all felt to be *the* grand effort. The hemp cable fast to an anchor laid out on the port bow, for the purpose of preventing the ship swinging more, had men stationed by it with keen axes, ready to cut, at the first signal. The main-deck was cleared of men to be out of harms way, if either of the chains by which "Hercules" had us in tow should part. I will here point out the securing of these chains, which was as in anchoring by the stern, bitted abaft and along the deck to the cable locker, where the compressors were housed taut; and at every bolt along the deck, deck stoppers were passed sufficiently tight; outside they were crossed between "Hercules'" stern and our own. Immediately before high water, the ship was lightened by pumping with the main engines, and as the Admiral was notified by the time, the signal was given by a preconcerted arrangement of flags. Men held their breath, and if they could catch sight of any fixed object beyond the ship, watched it to see whether its bearing altered; the steamers tugged their best, and the frantic gestures of delight of the captain of a tug laying off, conveyed to me the conviction that we were once again free. How can I picture, in my feeble language, the change on the countenance of that varied throng on the "Agincourt's" upper-deck at that moment. From "ardent hope" was evolved "delighted conviction," and he must have been an iron-hearted man who could fail on that moment to re-echo the British cheer which rose from the men in the ships at hand, as they saw us go with a "scend" off the rock. Action was again necessary; this we realised, when the noise of our own stern and the "Hercules" coming into collision showed that she had not been able to weigh her anchor in time to get out of our way; the bights of the cables hung around her screw, and to prevent fouling that, she slipped her ends and was soon able to trip her anchor and get out of our way. The tugs meanwhile, through some error in judgment, slipped their hawsers, and for a short time the "Agincourt," freed from the rock, was floating with her screw disabled, from the cables hanging around, and as it turned out, foul of it, otherwise it would have at once been connected. There was but one anchor on board, the port sheet, and upwards of 30 fathoms water to drop it in. Fortunately the necessity for doing so was avoided, by a tug at last closing and getting hold once again, and by the help of two of these craft, we were enabled to get to Getores Bay, where the remainder of the squadron had anchored, and where we at once began to re-ship the anchors and cables.

Before proceeding further, I will mention that in the event of this last attempt having been unsuccessful, the "Inconstant" had been ordered, and had prepared two anchors (one to back the other), which were to be dropped astern, and hove upon by ourselves—of course they were most fortunately not required; but I mention this, to show that precautions were used, and anticipations of non-success prepared for by those in charge of the operations. I believe also, that in the event of camels being required, certain vessels had been offered, and examined, to judge of their power and fitness.

The whole of the ensuing day was consumed in the attempts to clear the screw, which, being four-bladed, had caught and entwined the cables about it in a most puzzling way; and it was not till six o'clock that evening that the divers were enabled to conduct their operations to a successful close, and the ends were got in.

During that day too, another party of divers were employed in closing the crack in the plates beneath engine-room: cement prepared in the way I have before mentioned was sent down, and the engines pumping at the same time—the suction caused the composition to be drawn in, and after a short time the ship was made perfectly water-tight. On the following day (Thursday) the squadron weighed and stood across to the Gibraltar anchorage, and the "Agincourt" at once went alongside the Mole, and began the work of re-shipping her armament and stores. I think you will agree with me that in this work no time was lost, when I tell you that by Saturday at noon the whole of the guns and stores got out were again in, with the exception of the coals, and that there was nothing to have prevented her taking the sea at once. So confident were all who had seen her powers so fully tested on the rock, in the excellence of her construction and the means taken to stop the leak, that there was no one who would have hesitated for one moment to have gone anywhere in her.

The guns which had been landed at the dockyard had to be embarked again and towed alongside, and hoisted in. In 10 working hours on the first day, sixteen guns of 6½ tons, with their carriages and slides were hoisted in, mounted and transported to their places; and on the following days the remainder (two of them 12-tons) were got in, and by that afternoon we were able to wash away some part of the shrouding of coal dust which had surrounded us for so many days past, and enjoy on the following day, what I may fairly call, a well-earned rest.

But let me not forget to notice, now, the labours of the armourers of the squadron, who were sent to replace the gun-gear and fittings, which required mechanical knowledge. So admirably was their work performed under the supervision of our gunnery staff, that it elicited the spontaneous testimony of the Gun-wharf officials at Devonport on our return, who in a formal letter to the Commander-in-Chief of that port, stated that no ship had ever come into harbour with her guns and gun-gear in such perfect order as the "Agincourt," which they had just examined. And again, I may mention, that amongst the manifold parts of machinery, which constitutes gun-gear in the present day, and all of which was passed into lighters and sent away, there were but a few of the most trifling articles deficient; and this speaks volumes for the care with which the strange working parties, on whom fell the task of clearing the lighters on shore, fulfilled their duty.

When the "Valorous," which had been despatched with Mr. Angear as master-shipwright, from Keyham, and a staff of shipwrights, divers, &c., arrived, she found the object of her quest almost ready for sea again, and though their services were very great in repairing the damages due to our collision with "Hercules," matters of no *vital* importance, however, they found little to be done in the way of strengthening that

which had been already done before their arrival. The "Achilles" which had been ordered to ship timber and other stores for the purpose of strengthening vessels, for camels to assist us, was stopped on the eve of her start from Plymouth, by the news of our being afloat; a practical answer to the letter which it was understood Mr. Marcus Bland had written to the Admiralty to say, that "if they wanted to "get the ship afloat again, some one must be sent out who knew what "to do." And this brings me to the subject of the attack published in the *Times* and other daily papers by that individual; an attack which I may point out never came to our notice until our arrival in England, a fortnight or more after its publication. Most, if not all of you, read the letter in question, and some of you may have wondered that the reply to it was not forthcoming, and that what bore on its face so serious a charge should have been unanswered in the principal organ which gave it publication. I can tell you the reason. When at the time of our return to England, our eyes first met the letter in question, you may imagine our indignation, and easily picture the impulse of certain of our number, who would have sat down and given vent to their feelings. With a court martial at hand, where it was presumed all the evidence connected, not alone with the stranding of the ship, but also with her getting off, would be elicited, it was thought better to moderate their ardour, and letters were withheld until the sentence had been delivered. You know that that court martial did not think fit to make any inquiry into these matters, and therefore no public vindication could be entered before them, and it was then that individuals turned to the *Times*, the paper which had given an importance to Mr. Bland's letter, by its publication in conspicuous type; and there I regret to say it was that they met with the obscurity of the waste paper basket. I cannot—I think the verdict of my hearers generally would be, "I need not"—attempt to explain away Mr. Bland's statements. I have seen in no other quarter, have heard nowhere, anything to lead me to believe that the Officers and men who worked on board the "Agincourt" are credited with disorder, incompetence, or any of the other defects which were then assigned to them, and I can certainly call to mind statements, both from public speakers and writers, who have distinctly indicated the contrary belief.

One or two points in conclusion, and I will not trespass further on your patience.

1st. The want of proper stern-hawse-pipes (in addition to towing chocks, which bolted into the stern-ports) was most noticeable. Most of the other ships have such pipes. The result of our heaving stern cables over the chocks was that the iron casing cracked, and the edges broke off, and great damage was done to hawsers and ropes which had to be used in those chocks afterwards.

2nd. The utter futility of using hemp cables for one of these monstrous iron-clads, whose weight alone is equal to 10,000 tons; it was only used in our case, because of the accident to the chain cable which I have mentioned.

3rd. That for the cable working arrangements in the stern, the fittings of these large vessels are inadequate. There was absolutely no

means of controlling the cable in paying out, other than of lashing by fleets, and cutting the lashings in turn—surely a most tedious method—ring stoppers were of little value for a chain of $2\frac{3}{8}$ iron, which weighed 33 cwt. each length.

4th. The creditable test which the ship's frame underwent while on the rock—the enormous weight of nearly 10,000 tons—2 to 4 feet above its proper flotation, resting but on one point of that frame not more than 8 feet by 3 feet. Yet on examination afterwards in dock, there was no sign of deflection about any part of her, except where the rocks had made their indentations; and these, let me add, were so slight that there was absolutely nothing to have prevented the ship going to sea without repair, and it is my belief that but for the toughness of the iron of the starboard bilge keel, which was wrenched and got athwart ships, the ship would have come off on the first day, but this keel acted as a sort of toggle, and held her firmly.

5th. The success with which the divers trained in the service, conducted their operations. They were afterwards assisted by dockyard divers, but there was no necessity for such aid. What an advantage it would be for Officers to have a practical knowledge of diving, was proved most clearly. All through the anxious time I have taken you thus hastily, the report of an Officer would have often explained discrepancies in those of the seamen divers, who were on certain points of their reports at issue, and sometimes puzzled us folk above water. More particularly was this the case when clearing the cables which had fouled the screw. The screw had revolved after the cables struck it, and being four-bladed the bights were entwined to a most puzzling extent around the boss—necessitating unshackling below water, and the consequent hanging of parts, by hawsers bent and shackled, also below water.

6th. The gallant efforts of two engineer Officers and a leading stoker, who made their way through the intricacies of the inner bottom to the place where the leak was, in order that they might examine it; to do this, they had to crawl through man-holes in the framing, nine in number, I think, and all the time in water, which the pumps were working at to keep down. Fancy short dives through manholes under water!*

7th. The cement called after our chief engineer "Patterson's Particular," which though known pretty well under other conditions, and used often enough elsewhere, was used here first, I believe, for stopping a leak under water in an iron ship. I believe that Mr. Angear, the dockyard Officer sent out to aid us, placed small faith in its lasting powers, but I can answer for it that for some days it kept the ship quite tight.

8th. The necessity for an extension of the 40-horse power donkey pump suction to enable the double bottom to be pumped out readily by it. By the present arrangement it is led under fore stoke hole and requires 12 inches of water in the double bottom to cover the suction. With the ship 18 inches by the stern, this meant the presence of a large

* I am sure you will think their names are worthy of record, and I beg to give them: Messrs. Boyd and Coope and Leading Stoker Murray.

"AGINCOURT" Sketch shewing the damage occasioned to the

Scale 3/16 of an

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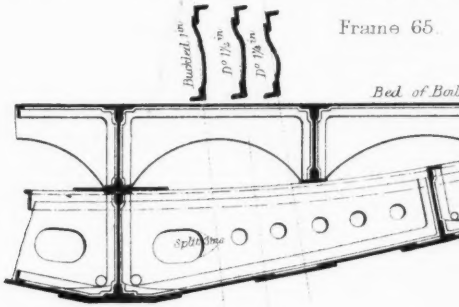

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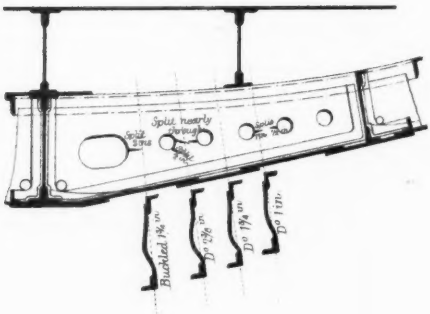

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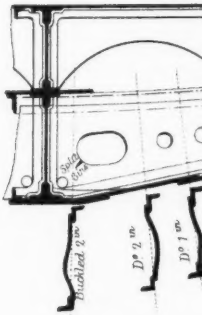

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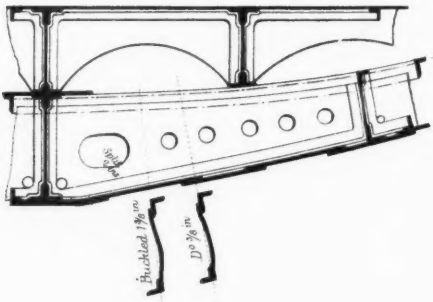

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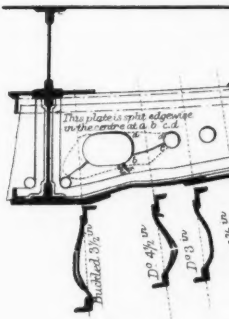
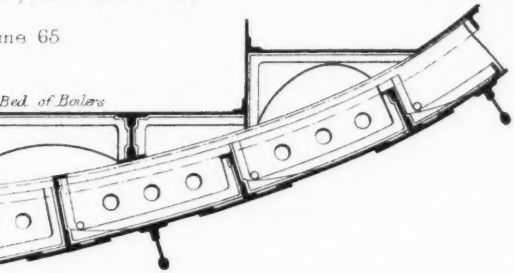


oned to the Frame Plates on the Starboard side by the Ship taking the Ground.

le 3/16 of an Inch to a Foot.

ine 65



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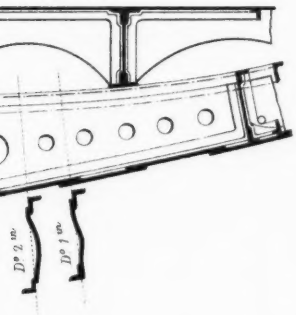

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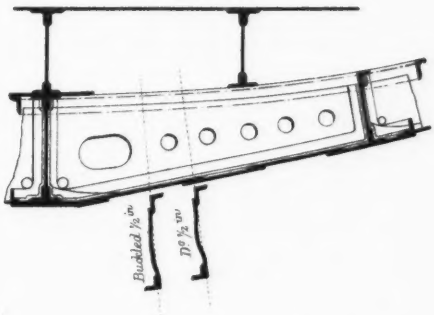

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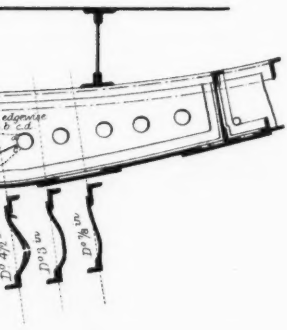

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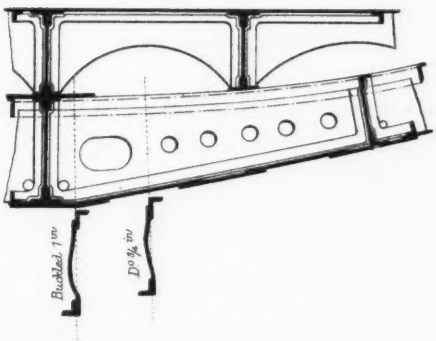
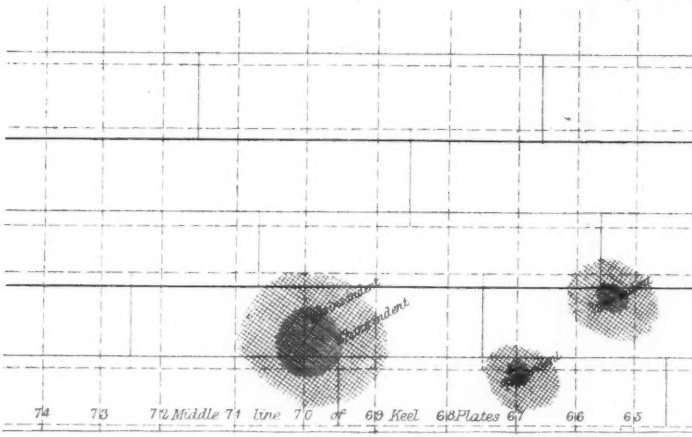


J. Jobbins

Sketch shewing the nature and extent of the damage occasioned to the Bottom plating &c on th

Longitudinal view of the lower bilge keel on the starboard side in wake of the

Expansion of the keel and bottom plating on the starboard side of the Ship in wak



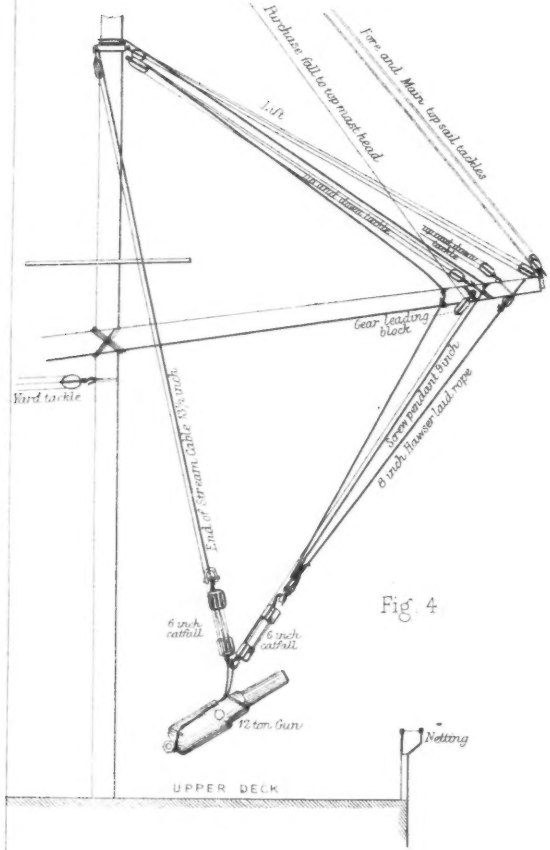
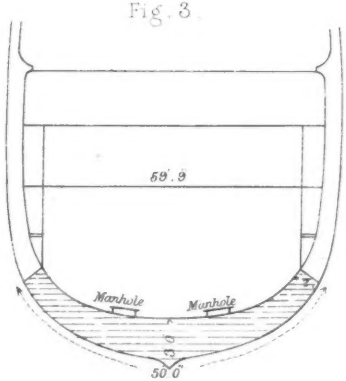


Fig. 4

Fig. 3



Mean height between bottoms	2 . 6
Length of Engine room	37 . 6
Length of Arch (say)	50 . 0
Weight of water in compartments	135 tons

N.B. 1 tackle was hooked to upper block of stay purchase to plumb the hatchway for this the Boats stay was brought aft from the mast before it

For hoisting out the yard was not shored. — but while hoisting in the topsail yard was used beneath it a topsail tackle to opposite lower yard arm to steady it from Topmast head opposite yard tackle was used for rolling tackle

Lashing of yard was 4 inch rope, as also those of the pendants on the yard.

Sketch showing

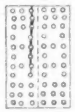
g &c on the starboard side of the Ship by taking the Ground

wake of the second Mast

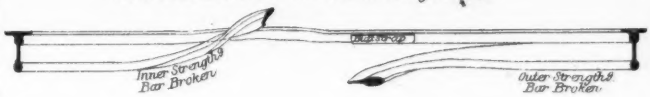
Ship in wake of 2nd Mast

Fig. 1

Butt Strap at A



Fore and Aft Deviation of Lower Bilge Keel



Expansion of Bottom Plating

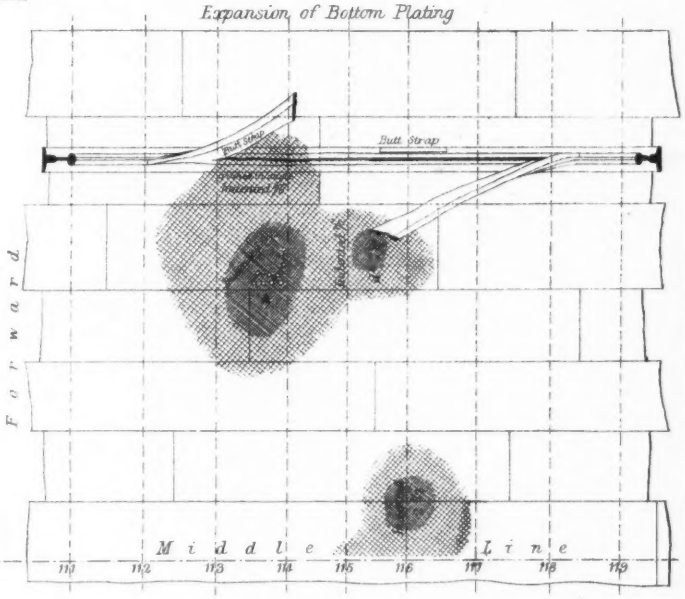
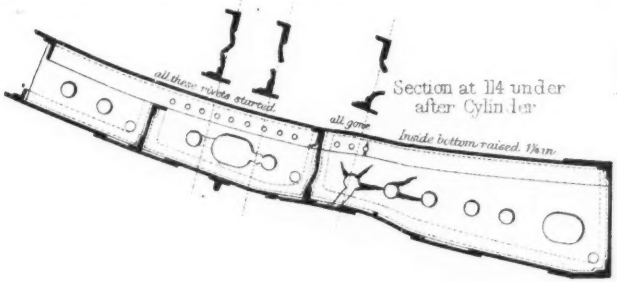
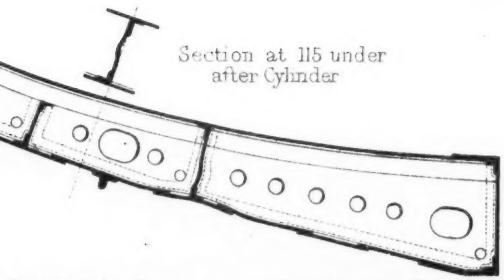


Fig. 2

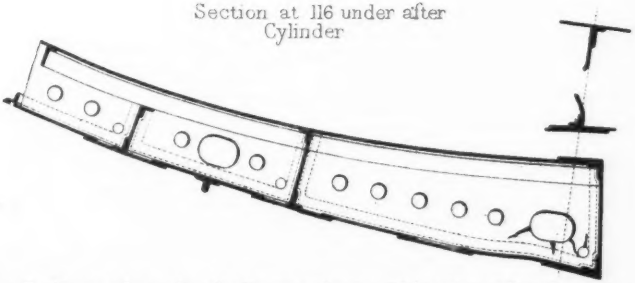


Section at 114 under after Cylinder

Section at 115 under after Cylinder



Section at 116 under after Cylinder



showing the damage occasioned to the Frame & bottom plating on the Port side under the Engines by the Ship taking the Ground.

J. Jobbins

quantity of water in the ship, larger than we at any time allowed to remain.

9th. The reserve of pumping power which was held in the engine-room, and which I have pointed out already; with such engines I cannot conceive a ship foundering if able to use her steam at all; with the screw disconnected, they were perfectly in hand.

10th. The want of a good system of pauls, or better still a serviceable *break*, for the steam capstan. This crying want, which is a slur on our service, should not be allowed to continue. The objection to the common pauls is that they are liable to be thrown down off the pin when out of gear, and before being noticed, break down the engine or injure the paul-plate. An attempt at a break, which was fitted to the "Agincourt's" capstan, was an utter failure. I suggest the application of a band at the capstan head. Surely our mechanical skill in the Navy will shortly supply this want.

The great advantage which might be gained in these monstrous ships by some means of readily detaching the enormous weight of iron-armour with which their sides are clad, is obvious, and deserves consideration. On the "Agincourt's" side were 1,700 tons, to start which in part, would have taken many days with full appliances, and under the present condition of fitment, their removal is practically impossible; that is, within any reasonable time.

Finally, let me wish that on the day—far distant may it be!—that any of you, my hearers, are in similar circumstances of difficulty, you may have as directors and helpers, Officers as determined and ready-witted, —men as loyal and hardworking as those who, whether belonging to the "Agincourt" or the remainder of the squadron, saw their efforts crowned with success on that 4th of July.

WEIGHTS HOISTED OUT.—*Approximate.*

Shot, shell, and powder	200 tons.
Guns, carriage, and slides	300 „
Coals	400 „
Anchors and cables	120 „
Boats, sails, W.O. stores, &c.	130 „
Provisions and water	150 „
Total	1300 tons.

	Forward.	Aft.
38 tons for the inch at load draught.		
Draught before taking the ground ..	26·8	27·10
Draught after coming off	23·11	27·10

Lightened 2 feet 9 inches.

Each boiler held 17 tons of water.

The CHAIRMAN: We shall be glad if you will explain the diagrams.

Captain BOYLE: The upper plan (see Plate ix, fig. 1) shows the indentation on the starboard side of the outer bottom. The blotches show where the points of the

rocks rested. That was the main point of bearing, and there was an indentation of about three inches there; and rather less here, and here (pointing). That was the first place on which the ship grounded. Afterwards on the port side that was the most important part (see Plate, fig. 2), and that is where the fish found its way in. This line shows the line where the bilge keel went along; this curve is a broken part of the bilge keel (Fig. 2). I may here express my belief that it was the bilge keel that prevented the ship coming off the rock much sooner than she did. It was such tough iron that it caught, and curved up on both sides; the ship settled down on those two parts, and the jagged ends cut into the rock and held with great tenacity. These indentations will show you the very slight amount of damage that was done to the ship at any time. It is only shown very slightly out of line; that is the worst part; you may see that that is the actual extent of the damage (see Plate). There was no part of the frame of the ship above the bottom strained in the slightest degree. The upper deck, main deck, and lower deck, were exactly in line; there was not the slightest strain. Nor was there any strain upon any part of the engine-room pipe, which would of course have shown it as readily as most parts. This gives you an idea of the amount of water that can be let into a ship by the double bottom arrangement; it would come up to there and no further on each side (see Plate). The "Agincourt" was divided fore and aft into eleven water-tight compartments, besides the double bottom arrangement. The deepest double bottom compartment in the engine-room (see Fig. 3) held from 135 tons to 150 tons. The plan for hoisting out the guns I will explain hereafter. Of course the work was all done from our own resources. I do not pretend to say that the tackle we employed was not a great deal too strong for the theoretical allowance for weights. But when I tell you it was rigged in just as short a time as the most entirely scientific purchase could have been, and that in that way it hoisted the guns out without the slightest accident, or straining of rope or iron, I think I have said all that is necessary.

The CHAIRMAN: Does any gentleman wish to ask Captain Boyle any question?

Captain RANDOLPH, R.N.: I have not exactly caught from Captain Boyle how much less water the ship had under her than what she drew, so as to give us an estimate as to whether she was at all water-borne, or how much weight had to be removed to float her. One further question—Whether during the whole of the three days the sea was perfectly smooth?

Commander GILMORE: May I ask Captain Boyle, having been present himself and seen the indentation at the bottom from the concussion of the rocks, whether he can form any idea what the result would have been if a small torpedo had been fired in the same position? The whole question resolves itself into this, if a ship grounds on a rock without her bottom being greatly injured, what would be their degree of safety against the effects of a torpedo?

Commander W. DAWSON, R.N.: I have to thank Captain Boyle in my own name, and I am sure I may express the thanks of those present for the very able way in which he has told a very good story. He has given us all an admirable lesson in one of the highest problems of seamanship. Most of us who have served afloat for any time have had considerable experience in ships running on shore as well as in getting them off, for it is no new thing for vessels to get on shore. Though it is quite true that ships are not stranded so frequently as in former days, yet depend upon it, so long as nerve and skill are characteristic of the Navy, close shaves will be made, risks will be run, and we shall continue to hear of ships going ashore and getting off again. It is not, however, every one who has the opportunity of gaining experience in recovering one of the largest ironclads in Her Majesty's service, a ship of no less than 10,600 tons weight. We are, therefore, deeply indebted to any Officer who comes forward to give us the benefit of such experience. It is, indeed, very much to be regretted that there are no official means extant by which such valuable experience gained in the public service can be communicated to the whole Navy, so that all might learn from the experiences of the few those professional operations which all cannot have the opportunity of practising in their own persons. It is impossible to listen to a description of the recovery of the "Agincourt" without carrying one's mind back to the recovery of a sister ship in the Thames, which was

described in this Institution by Admiral Sir John Hay.* On that occasion the "Northumberland" was in smooth river, in a dockyard, with the whole of the resources of that dockyard and of a number of other dockyards close at hand. Those engaged in that operation had the benefit of the experience of all the engineers and all the engineering resources in this and other countries. Notwithstanding the great skill displayed, the manifold appliances employed and the favourable nature of the locality, it took about a month to get the "Northumberland" afloat. This showed the enormous difficulties to be encountered in rescuing an ironclad of 10,600 tons weight from a perilous position on shore. All honour to those who succeeded so well in the case of the "Northumberland." But when we remember that the "Agincourt" was got off from a rock exposed to the whole Atlantic Ocean in four days by the ordinary resources of the fleet, for Gibraltar has not got the requirements for such an emergency—when we remember that the "Agincourt's" recovery was effected almost entirely by the ordinary resources of the fleet, and by the engineering skill of the officers and seamen of that fleet, without external aid or advice, we are bound to regard it as a most magnificent exhibition of modern seamanship. And we much abused modern seamen may well be proud of those distinguished officers who had the honour of getting that ship off. For my own part, I must confess that, until I heard Captain Boyle's paper, I was very much in the dark as to how it was possible to hoist out so rapidly and under such conditions, with the ship's own resources, no less than 1,300 tons of weights, including amongst them several twelve and a half-ton guns. Once explained to us, the whole operation is simple enough. It appears to have been effected by the good old devices, the principles of which were known and applied by us in former days. The several other evolutions that have been described are such as reflect great credit upon our modern seamanship and engineering skill, showing that we have not gone backwards in this particular direction, but that those who, like their professional ancestors, have the nerve and the pluck to get ships on shore, have the skill and the stamina to get them off.

Captain R. O'B. FITZROY, R.N.: There are two points in connection with Captain Boyle's interesting paper that I think ought not to be passed over on the present occasion. That is the difficulty we all experience in modern iron-clads in securing our ships by the stern, in anchoring by the stern, and in laying out anchors of sufficient weight to be of any use to haul an iron-clad off shore. It frequently happens that an iron-clad has to go inside a mole to take in coal, like the mole at Gibraltar, or the mole at Naples. There is great difficulty in securing the springs and stern fastenings for the want of proper leads for them, and the want of proper places to secure them to. It may happen to an iron-clad—it has not happened yet—that she gets on shore without any ship near her, or the means of telegraphing for a ship to help her off. Everything must be done instantly; it must be by downright energy on the spur of the moment. Weights must be got out without any hesitation, and she must have means and ways of carrying the weights away from the ship. It is a very serious question in the present day whether a modern iron-clad has a boat of carrying capacity enough to float her heavy moveable weights; whether it would be any use laying out a bower anchor to haul a ship of the displacement of the "Agincourt" off; whether it would have the slightest effect upon her beyond checking her going further on shore; and if she had no ship near her, how she could get her weights out quick enough to lighten her and get her off. The hatchways are not sufficiently large, and ships are not supplied with sufficient purchases and leads to get heavy weights out quickly.

Captain R. WELLS, R.N.: There is one statement I should like to make about the "Hercules," and I think Captain Boyle has not mentioned, that the bower anchor that was laid out, as well as the stern anchor, was not of the slightest use in moving the ship. They both partially held, but were coming home at a comparatively small strain. As to the "Hercules," I cannot help thinking but that we are much indebted to her for getting the ship off, owing to the wonderful way she was manœuvred for upwards of six hours in a strong current. Occasionally she was

* "The Launch of Her Majesty's ship 'Northumberland:'" by Rear-Admiral Sir John Hay, Bart., M.P. See *Journal*, vol. xiii, page 435, *et. seq.*—ED.

within 10 or 12 feet of the "Agincourt," and so near that every now and then one could have almost jumped from the poop rail of the one ship to the other. Thus, in justice to the "Hercules," some credit should be given her for the admirable handling. By a turn of the screw and keeping the ships close together, the labour of getting in the stern cables was eased, and the work much facilitated; in fact two or three hours did the work, and the attempt was made at the height of the tide the same afternoon, whereas, on the other hand, a timid man might have postponed it for a day or more.

Captain COLOMB, R.N.: I wish to make two remarks. First, with reference to the fitments for carrying out the chain cables abaft, that defect is not confined to iron-clads. I had occasion, in a ship I commanded in the East Indies, to feel that defect very severely after getting on shore. We found much in the same way, that there were no appliances whatever for getting a chain cable out abaft. We had to make the best of it we could, with a temporary arrangement of the heaviest baulks of timber we had in the ship. I wrote non-officially to the Admiralty about it, and I was informed then—it is nearly three years ago now—that the Admiralty had already noted the fact, and that in the new ships care was being taken to give all those fitments abaft that have been spoken of as necessary. Another point which struck me was this. Captain Boyle spoke of the failure of the sluice valve between two compartments, by which water spread from one of the so-called water-tight compartments, and filled or partially filled another one. I hardly ever heard of an iron vessel with so-called water-tight compartments getting on shore, in which there was not a defective sluice valve. I was engaged years ago in assisting to get off two iron ships, which were lost simply from the fact that their water-tight compartments when tried, turned out not to be water-tight. In the same ship that I spoke of, that I lately commanded, we had one small water-tight compartment forward. When I joined the ship I found it had been the practice to carefully work the sluice valves of this compartment every week. I had them carefully sealed up directly I got on board ship, and saw they were tight, and kept them tight the whole time. I think we shall always find wherever there is an opening from one compartment to another, which has sometimes to be open and sometimes to be shut, that it will fail in the time of danger, and that no "water-tight" compartment can be said to be so, unless it is—so to speak—hermetically sealed. I should like to ask Captain Boyle if he would roughly tell us the spars and the purchase used in getting the 12½-ton gun out; for I recollect years ago, when my friend Captain Dawson, I think, was with me, when we thought that 3½ tons was a very heavy weight to get out by the main-yard of Her Majesty's ship "Sidon." When we come to any weights, such as are described there, one would like to know exactly, for the purpose of record, what spars were found fitted for the work, what purchases, and whether the present supplies of stores are sufficient.

Admiral Sir EDWARD BELCHER: In the Royal Navy as far back as 1816 all the ships that went to Algiers were prepared with iron-plated ports for anchoring by the stern. Afterwards, in 1829, when Sir E. Owen had the "Southampton" fitted for the East Indies, the Admiralty directed that every ship should be prepared to anchor by the stern; and the "Southampton" was accordingly fitted with stern bitts. Again, in 1830, when I was ordered to fit the "Etna" for service, she was prepared with extra hawse-holes of gun-metal throughout the ship, in every direction on the upper deck, where any strain could be brought. She had them on either bow, on the quarter, and two astern. In the "Samarang" they were similarly fitted, indeed, in nearly all the ships I commanded; and I also know in the "Erebus" and "Terror," they were so fitted. It is therefore surprising to me that, knowing that these things were necessary years ago, it has not yet become the general practice in the Navy.

Captain COLOMB, R.N.: I should like to complete what I intended to have said, as it is rather an important point. It is with reference to what Captain Boyle stated about a double bottom connected in many parts, and a double bottom connected in few parts. It has been represented that in the modern double bottom, where the transverse pieces are very few and further apart than in the old plan, the new plan is the stronger of the two. I could not help thinking, while he was speaking, that he had given us something of a proof that the new plan was the right one; for,

unless I misunderstood him, he described the leak in the engine-room taking place because the strain of the outer skin of the double bottom was transferred to the inner skin by their connection at that point, and some rivets were driven through. We must suppose that if there had not been transverse pieces there, that these rivets would not have been driven through.

The CHAIRMAN: I also wish to ask one or two questions. Could the "Hercules" have anchored close up to your stern, as close as when she came near you, subsequently? When you were drawn off, did the rock on the port side scrape along the bilge? did you feel it, or had the vessel been so lightened that you passed over it? What was the total weight by which the ship was lightened? If nobody else has any questions to ask, perhaps Captain Boyle will kindly answer the questions that have been asked.

Captain BOYLE: I think perhaps the last question had better be answered first, because it in some sort applies to some of the others. The weights hoisted out were approximately shot, shell, and powder, 200 tons; guns, carriages and slides, 300 tons; coals, 400 tons; anchors and cables, 120 tons; boats, sails, spars, 120 tons; provisions and water, 150 tons; total, 1,300 tons. The ship required 38 tons at low draught to be hoisted out to lighten her one inch; and she was lightened 2 ft. 9 in. in all. Each boiler held seventeen tons of water. At the time that she went on the rock, she was more than two feet out of water forward; that is to say, there were 24 feet of water on the rock, and the ship's draught was 26 ft. 8 in. forward. When she came off, her draught forward was 23 ft. 11 in., and her draught abaft the same as when she went on.* The sea was smooth that day; indeed during the whole of the time that she was on shore, there was not a very important motion, but on the second and third days there was a certain amount of swell, which caused at one time, after we had grounded on the port side, some rather serious bumping. But on the day we came off, there was no motion. With regard to the effect of a torpedo on the bottom, a question which Captain Gilmore asked, I hardly know whether I can venture to offer an opinion. I should say that the sudden shock of an explosive would have infinitely more effect than the simple settlement of a great weight on a rock; therefore, I should say that, probably, a torpedo would have done infinitely more damage, although it might have acted on a greater surface. Captain Dawson brought before us the facts connected with the "Northumberland." Of course, I looked up those facts before I came here, but I saw nothing in them in which we could trace any resemblance. The people who got the "Northumberland" off, deserve all the credit that they have gained. I cannot venture to think that we had anything like the work that they had to do. About the stern-anchor, hove upon on Sunday night, not holding, suggested by Captain Wells. It was found to have come home considerably; so they stopped heaving on it. Then it was hove up again by the "Hercules" the next morning. With regard to the credit due to the "Hercules," I can only re-echo what fell from Captain Wells, that she was most ably handled. While I am speaking about her, I am sure that I may answer Admiral Ryder's question as to the "Hercules" anchoring. It would have been useless to have anchored her at first. But what she might have done, and what I think most will agree with me who saw the operations would have been better if she had done, was to have hung her stern to ours by a hawser, some stout hawser, and so have come close to us and remained with her stern towards us, because there is no doubt it was owing to the distance that we had to pass the chain cable along her, being her own length, in addition to the space she was from us, that much unnecessary labour was performed; whereas, if she had been stern on towards us, it is obvious the distance would have been infinitely less. That is the only thing I can venture to suggest as any improvement in the conduct of the "Hercules." On the last day, nothing could be finer than the way in which she was handled. The tide was not anything like as strong on that day as it was on the previous days. Having dropped her anchor astern of us, she was able to back into our stern and to remain in position; but it was

* At low tide, with a fall of 2 feet, she was thus 4 feet above her proper flotation resting on the rock.

not done without very great exertion and very great ability. I question very much whether there were many people who would have been able to have done it as well. Captain Colomb laid stress on the "stern fitments." I find in the present day there is a good deal of doubt on the subject of the advantage of stern fitments for anchor work; not in this assembly, I am happy to say, but amongst a good many others, I have found there is very great doubt as to their use, and one cannot lay too much stress upon their necessity. In the matter of the sluice valves, I can hardly agree with Captain Colomb. Of course I say this with doubt. But on board a well-cared for ship, I do not see that it is likely a sluice valve, which is worked every week, and more frequently, and constantly exercised with, should get out of order. On board the "Agincourt," as on board all other large ironclad ships, certain compartments used to be closed and worked for exercise. They were actually tested, and if those sluice valves were not there, the bilge water which invariably settles in any ship, whether arising from the actual sweat which streams down the side of an iron ship, or from any leakage, would not be able to go off into the bilge and there be pumped out. I think that is a very vital point. The spars used I will come to directly. We had "stern-bitts," as Sir Edward Belcher mentions, and good ones, but we had not stern hawse-pipes; we had not sufficient bolts along the deck; and we had no controller astern, as we ought to have had, and as I say every ship ought to have for large cables. The only means we had of checking and controlling the cable from paying out suddenly, was by lashing it by fleets to the bolts that we had on the decks and cutting those fleets in turn. When you have got a boat under the stern taking the weight of the chain, this is a very ticklish thing, as you will all agree with me. When we came off, I am afraid I cannot say whether the rock scraped along our bilge. We were so glad to be off, that we did not think about what was going on below.

The CHAIRMAN: Can you explain why the seamen gunners who went down the port side, did not find that she was touching on that side?

Captain BOYLE: The fact was I think that, although they went under the ship's bottom, their attention was directed to the starboard side. First of all, probably, they did examine all around the ship, and found her clear except on the starboard side; and when she grounded on the port side, they had made up their minds that the starboard side was the only one in risk, therefore, they did not pay so much attention to the port side. With regard to the spars used (pointing to diagram, see Plate ix, fig. 4), this is the mizen mast, the third mast, and that is the lower yard of that mast. It is an 86-foot yard.

The CHAIRMAN: Wood or iron?

Captain BOYLE: Wood, cross lashed as you see it; the mast is iron; with 72 feet height of mast from mast head to the deck. First of all, when we were hoisting out the six and a-half ton gun, all we had was a nine-inch screw pennant. We had not a sufficiency of blocks to use for taking them out to the yard with. We had cross lashings for the purchase pendant, and then took the end across the lower cap down on opposite side to the deck, and set up. The stay purchase pendant was the end of a 13½-inch stream cable, which was round the lower cap, and also brought down on deck and secured.

The purchases were made with cat blocks and six inch falls, anchor shackles used to connect them with the pendants. Hauling part of the fall of yard purchase led from lower block to the yard, thence to topmast head, and on deck; that of stay purchase to the lowermast head and on deck; two sail tackles from topmast head to yard arm; two up and down tackles, lower lift, and preventer lift were the supports of the yard. On the opposite side one sail tackle from topmast head, lower and preventer lifts and yard tackle as rolling tackle.

When getting the guns in, the yard was further shored with a topsail yard, whose goose necks had been taken off, and one yard arm of which, stepped in a shoe on the deck beneath lower yard, the upper yard arm being lashed out to the lower yard close to the yard purchase.

The CHAIRMAN: I have been asked by Sir George Sartorius to ask you, supposing you had not got lighters from the shore, how would you have floated the cable?

Captain BOYLE: On the last occasion, I presume our own boats would have been quite sufficient, even if it had been necessary with the "Hercules" in position. But

the "Hercules'" position on the last occasion was quite close enough to have done it without any assistance whatever.

Sir GEORGE SARTORIUS: If you had been by yourself and no other vessel near you, had you sufficient means to float out your chain cable to lay out a stern anchor, or bow, according to circumstances?

Captain BOYLE: We had a sufficiency of boats. I do not mean to say we should not have knocked them about sadly. We had thirteen boats in the ship. I do not see any difficulty in doing it if we had been put to it. We had two launches and pinnaces, two cutters, two life boats. All these boats would have been of great use in buoying a cable. Considering the smoothness of the water, I do not think there would have been much difficulty in that; if we had to lay out a stern anchor, of course, it would have taken more time than we had to spend about it, but I do not think there would have been any difficulty.

Sir GEORGE SARTORIUS: You must have been pulling at the same time.

The CHAIRMAN: Had you a steam launch?

Captain BOYLE: We had a steam launch. We should have laid out a stream anchor first of all, to haul out the boats to position.

The CHAIRMAN: I am sure I may return your thanks to Captain Boyle for the valuable and instructive paper he has read. I have no doubt you have all heard, as I have often heard, people express their doubts as to whether an ironclad could be got off (if she got on shore), on account of the great weights in her, and the difficulty of getting rid of them. We have lately had an account of two or three ironclads getting on shore, and being got off. I hope the process of getting them off will always be as well managed as in the case of the "Agincourt."

LECTURE.

Friday, April 12th, 1872.

COLONEL THE HON. CHARLES H. LINDSAY, M.P., in the Chair.

ON THE GENEVA CONVENTION OF 1864, IN RELATION TO THE AID AFFORDED BY VOLUNTEER SOCIETIES TO SICK AND WOUNDED SOLDIERS DURING THE LATE FRANCO-GERMAN WAR, WITH A GLANCE AT THE PROPER FUNCTIONS OF NATIONAL AID-SOCIETIES, PARTICULARLY THE BRITISH AID-SOCIETY, IN THE FUTURE.

By Deputy Inspector-General T. LONGMORE, C.B., Professor of Military Surgery at the Army Medical School, Netley; and delivered, in his unavoidable absence, by Deputy Inspector-General MACLEAN, C.B.

THE origin of my having the honour of addressing you to-day was an accidental conversation with Captain Burgess, the excellent Secretary of this Institution, during our autumn holiday last year in Dorsetshire. Some remarks which I then made to him respecting a prevalent misapprehension of the terms of the Geneva Convention, led him to suggest that it might be of use were I to make them more widely known through an address in this theatre. I did not at that time consider the matter one of sufficient importance to occupy the time of an audience at the Royal United Service Institution, more especially as I had already attempted to explain the Articles of the Convention shortly after the Treaty was concluded; but circumstances have since changed my impressions on this point, and it now appears to me, and it has appeared to some others, including the Director-General of the Army Medical Department, that a few public remarks on the subject may probably lead to some good. I myself have been led to this conclusion from observing in various articles in the newspaper press, but more particularly in the published replies to a series of questions issued by the British National Society for Aid to the Sick and Wounded in War, sentiments very generally expressed concerning the Geneva Convention of 1864, the intended modes of applying its Articles, and the immunities and privileges agreed to be conferred by it, such as, I am well aware, were never held by those who framed the Convention, and which, indeed, cannot be substantiated by a legitimate interpretation of the Treaty itself. I mention particularly the replies to the Questions put forth by the National Aid-Society, because these replies contain the views of Officers, and others, who acted as members of the Staff of the

Society on the Continent during the late Franco-German war, and of some others who were officially engaged in reporting on the practical working of the Convention during the war, and who, therefore, of all others might be supposed to be well acquainted with the provisions of the Treaty in question, and their respective limitations. Nor are the notions, which I expect I shall presently be able to convince you are erroneous notions, regarding the Geneva Convention, of trifling importance. On the contrary, they appear from the extent to which they prevail, to be causing the Convention itself to be regarded with very great suspicion and distrust, if not to be exciting hostility against it; by these means, to be raising obstacles to its legitimate and intended action in the future, should occasion unhappily arise for its application.

As I have referred to the questions and replies published by the National Aid-Society on the results of the experiences of its Staff, I beg to be permitted to say a few words respecting the Society and its late work, before I proceed to the consideration of the special subject of to-day's lecture.

I have no intention to refer to any particular part of the work in which the Society was engaged during the war; I only wish to express an opinion of its general results. The early history of the Society, its extensive and varied operations, have already been described in this theatre by the one, who, of all others was the most competent to do so, Colonel Loyd-Lindsay;* with, however, I must say, one exception—that exception being the very important part which he himself took in its establishment, its administration, and its success. I had the honour of being present at some of the preliminary meetings of certain members of the Fraternity of St. John; and admitting all due weight to the influence of this fraternity, particularly to the exertions of two of its members, Mr. Furley and Captain C. J. Burgess, I think all will agree with me when I say that the National Aid-Society only struck root after the earnest and energetic public appeal of Colonel Loyd-Lindsay, through the medium of the "Times," supported as it was by a most generous contribution to the subscription-list which he then opened. Neither should I omit to state, as I conscientiously can do from personal observation, that it was no less to his clear-sighted direction and promptitude of action, and unceasing devotion of his time and attention to the affairs of the Society, that its continued support by the munificence of the public, was mainly attributable. Every one felt confidence in the Society, from observing the manner in which its committee and agents worked under Colonel Loyd-Lindsay's guidance; no one doubted that whatever sums of money might be entrusted to it, would be laid out to the best advantage in the interests of the sick and wounded for whom they were intended; and so it was that funds and materials poured in from all sides, until they accumulated to the vast amounts which have been already described in Colonel Loyd-Lindsay's lecture.

* See Colonel Loyd-Lindsay's Lecture on "Aid to the Sick and Wounded in "War," delivered 31st March, 1871, and printed in Vol. xv, No. 64, of the "Journal "of the Royal United Service Institution."

The question is occasionally raised, when the subject is reverted to in conversation, whether the benefits conferred by these vast gifts, repaid the outlay. I have no hesitation in saying that when all circumstances are taken into account, as they ought to be, the expenditure will be found to be quite justified by the amount of good effected. No one can study the subject thoroughly and impartially without coming to this conclusion. I myself, indeed, have been surprised at so much having been accomplished, considering the suddenness of the events which called the Society into existence; the absence of all preparation or previous organization to meet the wants suddenly created; considering the rapidity with which the successive phases of the war followed one another, each phase changing circumstances of place and requirements; and considering also, as I shall presently point out, that the Society's agents had no legal or authorised standing for interference at the seat of war: when all these things are taken into account, I think no other conclusion can be come to than that it is a subject for great congratulation that the Society was able to minister to the wants of the sick and wounded so materially, and to so vast an extent as it did.

I have endeavoured to make my conviction clearly apparent that the sick and wounded of both armies during the Franco-German war did derive material benefits from the English and other National Societies who interfered in their behalf, because I intend presently to ask the question whether, as a general principle, the plan of administering such international aid in time of war be deserving of encouragement or otherwise; whether there were not exceptional circumstances in regard to the late Franco-German war which prevented the harm resulting, which may be expected to result, if such international aid to contending armies be established as a system and applied to future wars.

Every one who reflects on the matter must become aware that the title of the British National Aid-Society was a misnomer, as were for the time being the titles of all the other National Aid-Societies who helped on the continent during the late war, with the exception of the German and French Societies. The funds were subscribed for international purposes; the work of the Society was international; and, to all intents and purposes, the Society was an International Aid-Society. Although thus thoroughly international and not national, it has been generally held and stated, not only that the Society was established under the warrant of the Articles of the Geneva Convention, but that the Articles of the Convention conferred on all those who were thus internationally engaged in aiding the sick and wounded, the privileges of neutrality and inviolability of person. It is this assertion on which I believe it to be important a right understanding should be come to; for that it is devoid of truth, the text of the Convention itself, as well as collateral evidence, will, I think, sufficiently show.

Is it true, however, that the articles of the Geneva Convention have been interpreted as I have mentioned? Is it true that the help afforded to the German and French sick and wounded soldiers by the English Aid-Society was supposed to be grounded upon, and to be facilitated

by, the terms of the Geneva Convention? Quotation of a few of the published replies to one of the Society's questions will at once settle this point. Question No. 12, is:—"Would it have been possible to have come to the aid of the sick and wounded, as has been done in this war, without the facilities afforded by the Convention?" Here are some of the answers. "Not to the same extent, if at all."* "No."† "The Convention of Geneva has undoubtedly facilitated the aid afforded to sick and wounded in the late war; and this aid could not have been so effectually rendered without it."‡ "I am of opinion that it was owing to the facilities afforded by the Convention alone, that any effectual aid has been rendered by the National Society in the war."§ "Free locomotion in war time must always be difficult, and it would have been still more so had not the Articles of the Convention entitled all members of Red Cross Societies to circulate anywhere where their doing so did not interfere with military precautions or operations. The extent to which this was permitted may be inferred from the fact that newspaper correspondents frequently got attached to foreign ambulances so as to have the privilege of wearing their brassard, and penetrating where, as civilians, they would have been unable to reach."‖ "Most certainly not."¶ "Utterly impossible."**

These replies sufficiently prove that the officers and gentlemen who were acting under the directions of the British Aid-Society conceived that the Geneva Convention covered them with neutrality and protection, and that the Convention established a sort of right to administer help to the sick and wounded soldiers of the contending armies. Indeed, I need not rely upon the replies to the question which I have quoted, I may point to the whole series of replies to the questions put forth by the Society in proof of the universal prevalence of this belief among the respondents. One gentleman who was actively engaged in the work of the society informed me, on his return to England, that on one occasion, when he had been placed under temporary arrest by certain officers of the German Army besieging Metz, he had threatened to bring down upon them the interference of the British Government, his right to this interference being grounded on the Geneva International Convention of 1864. This is only one among many ways in which the mistaken supposition that the privilege of inviolability of person is conferred by the Geneva Convention on private gentlemen acting under the orders of an independent foreign society may lead to difficulties, but it serves to indicate how necessary it is that the nature of the Convention should be well understood, and its Articles rightly interpreted.

I formerly explained in this theatre the meaning attached to each article of the Convention by those whose business it had been to consider and define the terms of the Convention, but perhaps I did not enlarge enough on the limitations of the Convention in the particular direction I am now reviewing.†† Still I pointed to the fact that the

* Captain H. Brackenbury, R.A. † Seven Respondents give this reply.
‡ Colonel Cox, C.B. § Colonel Elphinstone.
‖ Mr. Austin Lee. ¶ Captain Norman. ** Dr. John Murray.
†† See Journal of the Institution, vol. x, page 162, *et seq.*—Ed.

Treaty only comprehended the military ambulances and hospitals of the belligerents, the staff employed in attending the sick and wounded contained in them, and the materials necessary for their proper treatment; that its Articles did not provide for any Volunteer or Independent Staff of Hospital Assistants; that such persons could only participate in the provisions of the Treaty by being regularly admitted into the hospital service and forming for the time being, part of the military establishments of the armies engaged, and thus becoming subject to the ordinary rules and articles of war. These latter would then come within the provisions of the Treaty, because then they would be comprised in the *personnel* of the military hospitals as laid down in the second Article of the Treaty.

To show how strictly the Treaty entered into by the different Governments of Europe confines itself to an acknowledgment of neutrality for the military hospitals of the belligerent armies, and to an engagement on the part of the belligerents to protect and respect them and their concerns only, I may point to the following circumstance. Prior to the Congress of 1864, in November 1863, an official circular was sent from Switzerland to the Governments of all civilized countries, making the following request:*—"Would the Government give its adhesion to an International Convention having for its objects: 1st. The neutralization in time of war of military ambulances and hospitals, of the *personnel* of the official medical service, of voluntary hospital assistants (*hospitaliers volontaires*) recruited by the Aid Committee, of inhabitants of the country who will go to help the wounded, and of the wounded soldiers themselves. 2nd. The adoption of a distinctive sign, &c."

This circular formed the basis of the deliberations which subsequently took place in the International Congress of Geneva, of August, 1864. After full consideration of the several subjects included in the circular which I have just quoted from, it was unanimously determined to exclude from the text of the Convention that part of the circular-note which suggested the neutralization of voluntary hospital assistants recruited by Aid Committees, and to confine the neutralization to the official sanitary *personnel* of the hospitals of the belligerents. This was done because it was plainly seen that the extension of the rights then proposed to be conferred by the Treaty,—not merely the right to be acknowledged neutral, and to be treated as neutral, but the right, also, to special privileges of respect and protection,—to volunteers not subject to military control, and perhaps not conversant with military arrangements, would very probably lead to incessant practical difficulties in field hospital administration which would interfere with the interests of the sick and wounded soldiers, and not improbably, also to disputes and embarrassments with foreigners belonging to countries with which the belligerents were on friendly terms. It was, moreover, known

* "Le Gouvernement adhérerait-il à une Convention Internationale ayant pour "objet: A. La neutralisation en temps de guerre des ambulances et des hôpitaux "militaires, du personnel du service sanitaire officiel, des hospitaliers volontaires "recrutés par le comité de secours, des habitants du pays qui iront secourir les "blessés, et des militaires blessés? B. L'adoption d'un uniforme ou d'un signe "distinctif identique pour les personnes attachées au service de santé, &c."

that several Governments would not give their adhesion to any treaty containing such a provision; indeed, I was myself informed by the representatives of more than one Government at the Congress, that they had orders to leave Geneva at once, in case the insertion of the neutralization of Volunteers in the proposed Convention, was insisted upon.

The Geneva Convention is simply a Treaty entered into by certain Governments with regard to the manner in which the sick and wounded of their armies, the staff employed in ministering to them, and the military hospitals and hospital *matériel*, are to be respectively dealt with in case of two or more of those Governments waging war with each other. All allusion to Volunteers, even of the countries engaged in war,—I need hardly say, therefore, all allusion to Volunteers from other countries,—has been rigidly excluded from the conditions of the Treaty. The Treaty nowhere contains any reference to the neutralization of any one not forming part of the Staff officially employed in the service of the ambulances and hospitals of the belligerents; there are no stipulations in it regarding private persons.

The mistaken ideas on these points have apparently originated in several ways. The articles of the Convention have been read apart from the preamble, which designates who the parties to the Convention are. Some of the Articles have been read separately, without reference to preceding Articles by which their terms and provisions are limited. The error has probably also been increased by the fact that at several meetings of delegates from the National Aid-Societies of various countries, especially at Paris in 1867, efforts have been publicly made to get the Governments who have adhered to the Geneva Convention to sanction the admission of independent volunteers, recruited by Aid-Societies, into that treaty, or to give them, by an additional convention, the same protection as was conferred on the hospital establishments o their respective armies by the original Convention. Had the Governments of Europe complied with these requests, the agents of the British and all other Aid-Societies would have had a legal status at the seat of war. But no such state treaty has been entered into, and, until this occurs, it is obvious, that the agents of Foreign Aid-Societies can only enter upon a theatre of warfare as private persons, with no claim to any exception to the restrictions which are usually imposed in time of war.*

* Among the projected modifications of the Geneva Convention of 1864 which were discussed, and proposed for adoption, on the occasion of the International Congress at Paris in 1867, were the following:—

"The members of all national societies for succouring the wounded combatants "of land and sea forces, likewise their auxiliary *personnel* and their *matériel*, to be "declared neutral."

"The societies of succour shall put themselves in direct correspondence with the "head-quarters of Armies, or with the Commanders of naval forces, by the "medium of representatives."

"The societies of succour, on the consent of their representatives, at the general "head-quarters, or with the Commanders of naval forces, shall be empowered to "send delegates to follow armies or fleets on the theatre of warfare, and to second "the medical and administrative service in their functions."

Again, the fourth subject in the list of propositions put forth for discussion by

The assumption that it was by virtue of the Geneva Convention foreigners gave aid to the French and German sick and wounded soldiers during the war, was manifestly all the more groundless, because among those who were actively engaged in this work were citizens of the United States of America. One of the field hospitals administered under the English National Society, and one which had the opportunity of being of essential service from finding itself in a position where large numbers of French wounded happened to be gathered without almost any of their regular military medical staff, was composed partly of American and partly of English gentlemen, and was known as the "Anglo-American Ambulance." Some other hospital establishments during the war were wholly served by Americans. Now, the Government of the United States of America, although it has been specially appealed to several times on the subject, notably after the Berlin Congress of 1869, has always declined to join in or to accede to the Geneva Convention; nor has the United States' Government entered into any treaty with European Governments of a nature corresponding with the Geneva Convention. Manifestly, therefore, the American surgeons and nurses were not acting in France by virtue of any compact such as the Geneva Convention is.

In truth, Americans were acting, as all the other foreign volunteer hospital aids were acting, in great measure through the concurrence of fortuitous circumstances incidental to the great struggle which was in progress, the complete success on the one side and the utter break-down on the other, the rapid succession of events, the extent of territory over which the warlike operations were spread, the prolongation of the campaign during the winter season, and, as a result of these conditions, the immense demands for hospital necessaries, food, wine, clothing, instruments, medicines, surgical articles of all descriptions; so that the military authorities on both sides were prepared to welcome persons who did not come empty-handed, but, on the contrary, who came with almost unlimited resources and abundant stores ready to be given away on demand. They were there by sufferance of the contending armies, who were glad enough to receive the donations brought by them; not by any right conferred through the Geneva Convention.

The published replies to the questions put forth by the British Aid-Society contain many complaints on the manner in which the Articles of the Geneva Convention were executed during the war by the belligerents, and the question is discussed in them whether, in consequence

the International Committee of Geneva, and read at the first sitting of the second Geneva Diplomatic Congress of 1868, was the following:—

"4º Mettre le personnel des sociétés de secours au bénéfice de la neutralité."

These facts afford a sufficient proof of the interpretation put upon the Geneva Convention by the distinguished delegates of the National Aid-Societies who met in Paris in 1867, and by the International Committee of Geneva in 1868. The Diplomatic Congress that sat at Geneva in October, 1868, however, notwithstanding the application for the volunteer *personnel* of National Aid-Societies to be included in the provisions of the Geneva Convention of 1864, only extended its principles to maritime warfare; they left the text of the original Convention, regarding military operations by land, intact, and thus a second time fixed the principle of applying the privileges of neutrality to the hospitals and official *personnel* of the belligerents only.

of the particular matters complained of, it does not become necessary to alter the text of the Convention. I have examined these complaints carefully, and have found in nearly every instance that the complaint is based on the mistaken reading of the Convention which I have just been discussing. The complainants have presumed on themselves, or property in their charge, being entitled to special rights, to immunity from the usual results and incidents of a state of warfare, which no one had agreed to confer on them. As to the alleged violations of the Geneva Convention elsewhere published, many of them—not all, it must be admitted, but many of them—are traceable to the same cause, viz., a mistaken notion of the nature of the Convention itself.

The Geneva Convention was thoroughly studied in Germany a considerable time before the war of 1870 broke out. Instructions issued by the Ministry of War made all the Officers and soldiers of the Prussian Army and allied German States acquainted with its Articles. A complete code of regulations was prepared by the War Department for the guidance of the National Help Societies to Sick and Wounded, defining their organisation, administration, positions of action, and duties of all persons employed by them, with their relations to the regular Hospital Staff of the Army Medical Department and to all other military authorities in case of war occurring and the Armies of North Germany becoming mobilised. The National Help Societies were restricted from collecting or practising for future use any stretchers or other ambulance conveyances, any hospital appliances but such as were of the patterns authorised for the military hospital equipment, so that there might be no jarring or confusion in case of the national volunteer aid having to be incorporated with the official services to meet the exigencies of war. In short, all the necessary preparations were made by the Prussian Government in strict accordance with the spirit and text of the Geneva Convention, and, there is no reason for doubting, with full intention of carrying out its provisions in their letter and in their spirit.

On the other hand, the French Government had done scarcely anything of practical value in the matter since the time it had acceded to the Convention. The Articles of the Convention had not been made known to the Officers and men of the Army, and, as might be expected, they exhibited an amount of ignorance regarding the Treaty and its objects such as at the time provoked general comment. At first, indeed, not simply the soldiers in the ranks, but many of the Officers, including those of the Hospital Staff, were manifestly not aware even of its existence. No regulations had been prepared for incorporating the volunteer with the official Army medical service when the war commenced, and, as an inevitable consequence, all was uncertainty and bewilderment in this direction at starting.

Permit me to quote a short passage from an able essay on "Hospital Administration in Modern Armies," by a French writer, in a recent number of the "Revue des Deux Mondes,"* to confirm what I have

* Le Service de Santé dans les nouvelles Armées Européennes, observations et souvenirs de la dernière guerre, par M. Léon Le Fort, Chirurgien en Chef des Ambulances de Metz.—Revue des Deux Mondes. Tome xcvi, Nov. 1871, p. 124.

just said. "Unhappily," he writes, "the Convention of Geneva was hardly known to the French Military Intendance, and at the opening of the war nothing was prepared to put it into execution. When we arrived at Metz, not a French Army surgeon, not a single infirmier wore the brassard, not one of the ambulance vehicles had on it the distinctive sign of neutrality." And the same writer shows that when the authorities of the French Intendance subsequently applied the Convention, either from carelessness or from not properly appreciating its terms, they issued their stamped brassards in profusion to persons not entitled to receive them. Thus the very authorities whose duty in France it was to see that the Articles of the Convention were strictly adhered to, neglected the Convention in the first instance, and contributed to its abuse in the second. No wonder that a marked change occurred after this time in the respect paid by the Germans to the French official brassards. No wonder also that a necessity is generally felt for a revision of the Convention of Geneva with a view to determine whether the limitations of its articles can be more strictly enforced, and whether, in the interests of the sick and wounded, it is possible to punish abuse of them by any other means than retaliation.*

The remarks I have hitherto made have shown that the only Aid-Societies capable of being brought within the Geneva compact of 1864 are the National Aid-Societies of the countries at war with each other, and that in order that the *personnel* of these societies may have a legal title to the protection accorded by the treaty, that *personnel* must be placed under military regulations during the period of service, incor-

* General Dufour, Honorary President of the Geneva International Committee of Aid to Wounded Soldiers, has circulated for consideration by the National Aid Committees, an essay recently read by M. Gustave Moynier, in which the creation of an International Court in time of war is proposed with a view to effect the repression of violations of the Convention of Geneva. M. Moynier, after showing the need which exists for such a judiciary institution, after indicating the various plans which have been previously proposed or employed for ensuring due observation of international laws and treaties, and referring to the constitution of the Committee of Arbitration agreed to by England and the United States with regard to the Alabama claims, reduces his scheme to the form of a projected Convention embracing ten Articles. The following extracts exhibit the principal points contained in them :—

Art. 1. In order to ensure the execution of the Convention of Geneva of the 22nd of August, 1864, there shall be constituted, in case of war between two or more of the Contracting Powers, an international tribunal to which all complaints of infractions of the said Convention shall be addressed.

Art. 2. This tribunal shall be formed in the following manner: As soon as war has been declared, the President of the Swiss Confederation shall designate by lot three of the Powers who are signataries of the Convention, excluding the belligerents. The Governments of these three Powers, as well as those of the belligerent States, shall be each asked to nominate an Arbiter, and the five Arbiters shall assemble without delay at the place provisionally indicated by the President of the Swiss Confederation.

Art. 3. The Arbiters shall determine for themselves their definitive place of session. The details of organization of the tribunal and course of procedure shall be left to them.

Art. 4. The tribunal shall only occupy itself with violations of the Convention respecting which complaints shall be made by the Governments concerned. The tribunal shall submit the alleged violations to a searching enquiry. The necessary facilities

porated, indeed, for the time being with the staff of persons employed by the War Department of the Government concerned in the military hospitals, and must be occupied in one or other of the capacities particularized in the terms of the Convention itself. Only while so engaged, and on no other conditions, can such persons claim a right to participate in the benefits of neutrality, to use the language of the Convention. Persons belonging to the National Aid-Societies of non-belligerent countries, although the Governments of these countries may have acceded to the Convention, cannot through an *international* action, lay claim to any corresponding immunities or privileges under the Geneva Convention.

I will now glance at the question—is it desirable to establish systematically a plan of international aid, such as was afforded during the late war? Or that the provisions of the Geneva Convention should be extended to persons of neutral countries carrying international aid to the sick and wounded of armies at war with each other?

I have already acknowledged that a vast amount of benefit was conferred on the sick and wounded of the contending armies during the Franco-German War by the international aid which was afforded to them. It by no means follows this admission as a matter of course, however, that what was done during the late war can be done again with equal advantage in future wars, or, at any rate, that it would be judicious for a body to be permanently organised for affording such assistance. The question is a very serious one from whatever point of view it is looked at, and much may be said on both sides of it; but although cogent arguments may be urged on the score of common humanity, and our feelings strongly moved by appeals to this consideration, my present conviction is that such a system, if established, would be attended with a greater amount of evil than of good. That a nation should be always prepared for war, to defend itself if need be against insult or injustice none will gainsay; but it must be equally the wish of every right thinking person, that nothing shall be done which shall render the occurrence of war easy, or facilitate its continuance when once it has commenced. Now, although the existence of International Aid-Societies, if they were to be established and acknowledged by treaty as some contemplate, might have little *direct* influence in provoking or averting appeals to battle by states for the settlement of their differences, there can be little doubt but that an important *indirect* influence would be exerted by them. One of the greatest incumbrances of an army in the field is its sick, together with the wounded which remain after a general engagement; and the

for instituting this examination shall be accorded by the signataries of the Convention, and especially by the belligerents.

Art. 5. The tribunal shall formulate its opinion in a verdict of guilty of violation, or not guilty for each case brought before it. If guilt be established, it shall pronounce a punishment conformably to an international penal law which shall be made the object of a Treaty forming a complement to the present Convention.

Art. 6. The tribunal shall notify its judicial decisions to the Governments concerned, and these Governments shall be held responsible for inflicting the sentences pronounced against those of their subjects who have been guilty of infractions of the Convention.

weight of this incumbrance has been vastly increased since so much public attention has been given to all that concerns the proper care and treatment of such disabled soldiers. If the sick and wounded are very numerous, the mobility of the army is for a time paralyzed, so long as the army has only to rely on its own resources for their surgical care and transport. But if a system of international aid be legally established and thoroughly systematised, these difficulties will in a great measure be removed. The sick and wounded will be given over to the care of international volunteer hospitals, and the mobility of the main part of the army will be restored. The Commander of the Forces will be at once ready to march onward, and, should occasion occur, to fight another battle. Thus the very object for which such societies would be established—that of mitigating suffering—would be defeated. There would be multiplication of wounded, and, in the end, unless the international aid were almost unlimited, less attention would be given to them. This is one important reason why the establishment of a system of international aid in time of war appears to me to be a thing not to be desired, even if it were generally practicable. Before the outbreak of the late war, no such system of international help had been established; and, therefore, the help which was afforded could exert no influence on the preparations made by the respective armies to meet the wants of their sick and wounded. All that was done by the British aid internationally given was so much in excess of what the sick and wounded would have had without such assistance; and hence the objects of the subscribers to the funds of the English Society were fully carried into effect. But if similar assistance is to be relied on in case of future wars of which this country might be a neutral spectator, who can say how far this reliance may influence the extent of the preparations made by the states entering upon the war for their hospital services? These are grave considerations which certainly ought to be well weighed in this country, where liberality, and the means of liberality, so much abound.

With these views regarding the doubtful expediency of systematizing international aid in time of war, I need hardly say it was a source of satisfaction to me that, although the work which called our English society into existence was really international work, one of the principles of its existence, and the first among them, was settled at the public meeting held at Willis's rooms on the 4th August, 1870, to be the contribution of aid to the sick and wounded forces of our own nation. This principle I hope will be mainly kept in view in the future. In this country especially, there appears to be a legitimate field for the operations of such a society. There are not in Great Britain the same facilities for making adequate provision to meet the requirement of the wounded in time of war as exist in other European States. In considering the best practicable arrangements for the proper care of the wounded in war time, the effects of the system of enlistment as compared with one of conscription force themselves on our attention, just as much as when the organization of the British Army at large has to be considered. Where an army is raised by conscription there is comparatively no difficulty in calling such numbers into the ranks that an

adequate proportion may readily be withdrawn for training, and, on need arising, for acting in the special duties of bearers of sick and wounded, without material injury to the fighting strength. But when an army is composed of men collected by the costly process of enlistment, it is unreasonable to expect a like proposition to be available; at any rate, it is hardly likely to happen that the necessary numbers ever will be found to be spared from the combatant ranks for such training and duties. The combatants of an enlisted army must always be comparatively limited in number, and no avoidable diminution of that number is likely to be permitted. When active hostilities are in progress the concerns of the sick and wounded, from the very nature of war, will always be a secondary consideration. Now, however, that the regular army is strengthened not only by its Militia reserves, but also by a numerous Volunteer force, may not the latter be got to supply, under proper direction, at least for home service, a proportion of men willing to undertake those duties in aid of the sick and wounded, which in some continental armies are performed by a proportion taken from the companies of regiments? May not the collecting, training, and preparing Volunteers for the discharge of these duties form part of the work of the National Aid-Society? In case of a force consisting of Army, Militia, and Volunteers being brought together for defensive purposes in this country, it will be manifestly essential that the hospital arrangements for the sick and wounded, including the Ambulance Transport arrangements, shall be under the one supreme direction of the War Department; but it is impossible for this department of the Government to maintain in time of peace the number of Hospital Assistants and trained attendants who will be required in time of war, not only for meeting the first necessities of the wounded, and for conveying them from hospitals in front to others in rear, but also for giving that care and attention to them which become necessary for long periods subsequently. No Government has ever yet been able to do it, nor is it likely will ever incur the expense which would be involved in such a proceeding. But unless the persons who are to bear the wounded from fields of action, and who are to help in removing and attending to them afterwards, are properly trained and disciplined in time of peace, they are not likely to be of much use, are often likely to do much harm, when so employed in time of war. Few are aware how many lives and limbs in time of war, that might under other circumstances be saved, are destroyed by want of requisite knowledge for the discharge of these duties. A corps of trained bearers, composed of volunteers, whether organized into a distinct body available for service, wherever required, or collected, on occasion arising, from trained men out of the companies of Volunteer regiments, would constitute a body corresponding in its functions with those of the *personnel* of the Sanitary Detachments of German Armies, and might be turned to valuable account in many ways, while military operations were in progress.

I think we are justified in believing that the establishment of National Societies for Aid to the Sick and Wounded of Armies in time of War has obtained so deep and extended a hold in Europe, that no

efforts made by persons who object to their existence will succeed in uprooting and putting an end to them. If this proposition be assented to, all must agree that the consistent and wise part will be so to direct their action, that no impediments to the military operations in which armies are engaged shall result from it, no risk of international difficulties be engendered; but, on the contrary, that their action shall be made to conduce, to the fullest practicable extent, to the mitigation of those sufferings to which the Societies owe their origin, and on account of the existence of which they are supported.

Regarding our own National Aid-Society from this point of view, considering its main purpose to be that of supplementing the regular hospital service of the War Department of the Government in case of the country becoming involved in war, the following appear to me to be principles which it is essential for the Society to adopt in order that its aid functions may be most efficiently discharged.

1. The National Society should direct its efforts in the first instance to procure official recognition, not merely as an independent body invested with special privileges, but as a Hospital Reserve for Help to the Sick and Wounded of our National Forces. It should seek to establish definite relations with the War Department through a representative Director of the Volunteer Aid Establishment.

2. The Society should devote itself to national interests. It should try to solve the important questions—in what direction, and by what means it can best supplement the official aid to sick and wounded in case of the country becoming involved in war, always keeping in view the special circumstances of the country, and of its Army organization. After these questions have been solved, it should take whatever steps may appear to be best suited for preparing itself in time of peace to meet the exigencies which it believes itself competent to meet in time of war.

3. A code of regulations should be prepared, and, when sanctioned, issued by authority, defining the duties and responsibilities of the Volunteer Hospital Staff, acting under the direction of the Society, in the same way as regulations are issued for the guidance of the combatants of the Volunteer Forces.

I have not attempted to discuss details, for it would be useless to do so before the principles of action I have named are approved and accepted. If these principles become established, the best method of filling up the outline sketched out, will necessarily form a subject of subsequent study. They are the principles on which alone, I believe, the Society can hope for its future operations to be attended with unmixed and reliable good results. If they be rejected, if the Society trusts to its own powers as a free and independent body, if its members confide in some presumed influence of the Red Cross without inquiring particularly into the statutes and limitations under which this sign has been accepted as an emblem by international treaty, I fear the Society will never be able to justify the name under which it exists; while, on the contrary, by adopting and acting upon them, I believe the Society may become an institution capable of affording essential assistance to our Government and country in the hour of need.

APPENDIX.

It may be useful to indicate, in some particulars, the manner in which the German War Department dealt with the Geneva Convention by official regulations prior to the outbreak of hostilities with France. A reference to some of the provisions of the Royal Warrant of the 29th of April, 1869, defining the "Plan of Mobilisation for the North German Army,"* together with a few extracts from the German Army Medical Field Regulations, will suffice for this purpose. First, with regard to the Royal Warrant above cited:—

1. This Royal Warrant contains, as an appendix, a reprint of the Articles of the Geneva Convention.

2. A section of this Warrant, headed "Instructions for the Army Medical Department in the Field,"† has been supplied by the War Office to all Officers commanding troops; and it is assumed that all combatant and medical Officers are thus acquainted with the instructions and with the Articles of the Geneva Convention. The troops also are made acquainted with them through the authorised courses of instruction given by Officers to the Serjeants and men at fixed intervals.

3. These Instructions contain the following passages:—

a. All persons belonging to the Army Medical Department must be provided, as soon as war commences, with the Neutrality-badge; Surgeons, Military and Civil Officers connected with hospitals, Hospital Orderlies and Bearers of Wounded being comprised in this category.

b. All ambulance conveyances, field hospital carts, waggons, and hospital tents, have to be marked with the neutrality sign.

4. The Directing Surgeon of each army corps, or, as representing him, the Surgeon in charge of a detached body of troops is required to designate beforehand the Surgeon, or Assistant-Surgeons, Orderlies, proportion of ambulance stores, and transport which, on events requiring it, such as wounded having to be left on the ground, &c., are permitted to take their risk of falling temporarily into the hands of the enemy under the protection of the Geneva Convention.

Further extracts from the Instructions for the Army Medical Department, before named, bearing on the subject of the Geneva Convention of 1864:—

Para. 2. The sick and wounded of allied troops, as also sick and wounded prisoners of war, are equally entitled to medical treatment.

Para. 7. During minor engagements the wounded will be taken to the temporary places for dressing wounds by the assistant sick bearers. As far as possible four men per company will be selected for this purpose from the men who have already been trained to this duty in time of peace. They will be distinguished by the white armlet with red cross worn on the left arm.

Para. 13. Temporary hospitals are to be denoted by the National Flag, and by a flag with red cross; after dark by a red lanthorn.

* Mobilmachung's Plan für das Norddeutsche Bundesheer.

† Instruktion über das Sanitätswesen der Armee im Feldr.

Para. 19. In the event of a retreat, the Commander of the Sanitary Detachment must arrange that both men and *matériel* follow the Army. The Principal Medical Officer determines who of the surgeons and their assistants, with the necessary appliances, are to remain with the wounded under the protection of the Geneva Convention.*

Para. 24. The hospital buildings will be distinguished by the National Flag, and a white flag with a red cross.

Para. 25. In the event of a retreat, the Principal Surgeon of a field hospital is responsible that the transport as well as men and *matériel* not required, follow the Army, if possible, in conjunction with the nearest sanitary detachment. The personal assistance required by the sick who have to be left behind, will be determined by the Principal Medical Officer, and only follows the Army after assisting in the further treatment and care of the sick.

Para. 79. The armlets with red cross issued to persons belonging to the volunteer establishments, must bear the stamp of the Royal Commissioner, who is further required to furnish each person, to whom an armlet is issued, with a certificate of authorisation to wear the Badge of Neutrality.

List of persons taken from the Dress Regulations, who are to wear the *brassard*, or arm-badge, in time of war.†

During war the following are entitled, and respectively obliged, to wear the white armlet with red cross, the Badge of Neutrality of the Geneva Convention:—

1. Medical Officers in charge, and their assistants.
2. All persons belonging to Sanitary Detachments, Field Hospitals, and Hospital Reserve Depôts, as also the Hospital Reserves.
3. The Medical Officers, Hospital Assistants, Assistant Sick Bearers and train soldiers, with the regimental cars, and the train soldiers of the Medical Officers.

The armlets, which are to bear the mark of the regiments or corps in the middle of the joining, will be worn on the left sleeve of the coat or cloak in the middle of the upper arm.

Sir HARRY VERNEY, on moving a vote of thanks to Professor Longmore (which was seconded by Colonel Alcock), said: I feel sure that I speak the sentiments of all present by expressing our thanks and acknowledgments to Professor Longmore for the admirable paper which he has sent to us, and which Professor Maclean has just read. The interest taken in the subject of it by the whole nation was amply shown, not only by the very large contributions in money, and materials of all kinds, in the summer, autumn, and winter of 1870, but still more by the personal work of so many persons of both sexes and of all ranks, both at home, and when they proceeded to the seat of war, and aided in mitigating the sufferings of the battle field.

* The Articles of the Geneva Convention are appended in extenso to this paragraph. (Beilage 4. Instruktion, &c., page 110.)

† Beilage 17. Nachweisung der Uniformen und Abzeichen des Sanitäts-Korps. (Instruktion, &c., page 159.)

But what has hitherto been wanting has been the intelligent direction what to do, and how to do it—how to utilise the efforts of zealous benevolent persons for the objects that we all had in view. That want is supplied by Professor Longmore's paper. He has given us in it the result of his thoughtful experience. He has pointed out how our efforts ought to be combined with, and, of course, in subservience to, the arrangements of the War Office and Government of the country, in case our armies should be called into the field. He has shown how we may be of use, without exciting the jealousy of our own or foreign authorities, and how we may act with that which, above all, is essential,—the goodwill and co-operation of our own military commanders.

There is no doubt that in the Franco-German war, the Red Cross was abused. He tells us how its abuse may be—indeed must be—avoided in future.

I believe that many of us are convinced, that only by regulations such as Professor Longmore suggests, and acting vigorously under them, will the "Aid-Society to Sick and Wounded in War" be able to carry out the objects for which it exists. We shall all study his warnings and admonitions, and they will be especially valuable to the Council of the Society, furnishing to them information and advice for the work which they have to undertake in directing the future operations of the Society.

We also thank Professor Maclean for his statement on the important duties of the trained Krankenträger, a statement founded, apparently, on his personal observation, and so pertinently illustrated by his reference to the case of that gallant American General, Stonewall Jackson, whose course we all, whether favourable to the North or South, followed with admiration, and whose untimely death we could not but deplore.*

* On this point Professor Maclean observed, it is a great mistake to suppose that any men picked up in the street, or even taken from the ranks, are capable, without special training, of performing the duties of an Army Hospital Corps. On the contrary, it may with truth be described as a species of skilled labour. In the case of a man in the field, let us say with a simple fracture of a limb, if unskilfully handled by untrained men, the injury may in a moment be converted into a "compound" one, to the serious detriment of the sufferer, and in some cases fatal consequences may result. In this way the good and gallant Stonewall Jackson lost his life. He was wounded, but not mortally. The soldiers who removed him from the field did this in so unskilful a manner that death resulted.

Evening Meeting.

Monday, April 29th, 1872.

LIEUTENANT-GENERAL HENRY EYRE, in the Chair.

NAMES of MEMBERS who joined the Institution between the 16th and 29th April, 1872.

LIFE.

Campbell, H. F. J., Commander, R.N.
Craigie, R. W., Sub.-Lieut., R.N.
Lees, E. B., Major, 31st Lanc. Rifle Vols.

ANNUAL.

Jones, Lewis J. F., Lieut.-Col., late Dept. Batt.
MacDonnell, John R., Major, 19th Middx. Rifle Vols.
Stewart, Hon. Walter J., Lieut., 12th Royal Lancers.
Cochran, Francis, Capt., 37th Regt.
Philip, Francis L., Capt., 2nd Rl. N.B. Dragoons.
Tottenham, H. A., Major, Bengal Staff Corps.
Silver, Hugh A., Lt.-Col. 9th Essex Rifle Vols.
Gordon, W. C., Esq., Assist. Commissary.
Law, F. T. A., Capt., R.A.
Lees, T. Evans, Lt.-Col., 31st Lanc. Rifle Vols.
Westloe, F. H., Lieut., 2nd Rl. Cheshire Mil.
Gooddy, Edward C., Capt., 44th W. York Rifle Vols.
Higgins, F., Major, 6th Lanc. Rifle Vols.
Coyney, W. M., Capt., 3rd King's Own Stafford Rifle Militia.
Smyth, Geo. J. Fitzroy, Lt.-Col., Coldstream Guards.

THE AUTUMN MANŒUVRES OF ENGLAND.

By Captain C. B. BRACKENBURY, R.A.

IF we study the rise and progress of all reforms or revivals in countries where public opinion has power, we shall find a general resemblance in their various histories.

There is, first, a condition of mind in the nation generally, rendering men ready to listen. Then there stand forth certain individuals who have read much or had much practical experience of the subject, and they speak their thoughts boldly as prophets, setting themselves at the same time like pioneers to clear away the obstacles which stand in the way of their favourite projects. At first their words have little power to lift the dead weight of custom. They are treated as dreamers and enthusiasts, and a thousand reasons are found for pronouncing their ideas absurd, unpractical, impossible. But by degrees the truth of their arguments becomes manifest to a gradually increasing group of hearers, and the possibility of their being right is felt more widely and deeply every day. It is at this stage that a new class of advocates appear, men who have wit enough to know that the change is coming, and love of novelty enough to be slightly in advance of the bulk of their fellows. The chorus grows louder, and overpowers the voices of the dissentients, who are soon found,—most of them at least,—declaring that, for their parts, they always saw the value of the thing, had indeed proposed it, but in some other form. All difficulties vanish, and the new belief becomes fashionable. But it is just at this point that the greatest vigilance is required, lest the fashion should become

folly, and the life of the thing be pressed out of it under the weight of the applause lavishly heaped upon it. The men who first laughed at the proposal, then were wroth with the proposers, then said it was good enough, but unsuitable to the country and the epoch, then claimed to have been its originators; these men are still its enemies, for, finally, they go near to kill it with kindness.

It is, therefore, not surprising to find the mass of men oscillating violently from one extreme to the another, nor to see in the same community and at the same time, parties enunciating opposite dogmas as articles of faith, and quoting on either side the opinions of great men who never really differed.

Now it seems to me that there are just now in England two great principles which have got themselves generally accepted, but which men will persist in treating as antagonistic, though they are not so by any means. They are, first, the great laws of political economy, with their natural offspring, a love of peace and non-intervention abroad; secondly, the wisdom of readiness for war, with its corollary the necessity for practising during peace, the arts of war. So, on the one side we get men, otherwise sensible, who insist on the infinite wisdom of getting rich at all hazards as quickly as possible, and would clutch their money bags to their bosoms, terrified at every rough sound outside their house, rather than pay for a good watch dog, and a trained policeman: while, on the other side, we find Englishmen who see in the revival of the military art nothing less than a chance of interfering in all the quarrels of our neighbours; men who want to keep a pack of bloodhounds, and turn all their workmen into soldiers.

May it not be well that the moderate economists should declare themselves distinctly in favour of having and keeping up a good army fully able for all England's needs, and that soldiers who know what war is and what the chances are for an unarmed nation—alarmists, if you choose to call them so—should declare with equal distinctness that they want war no more than their friends on the other side, but that certain forces must be prepared for highly probable contingencies. It is also their business to say what those forces should be, and to what point they require training.

Speaking with all reverence of the now famous words of a wise and sober statesman, the present Lord Derby, I cannot agree that the problem as to the strength and training of the Army of Great Britain is quite so simple as he puts it. Let it be granted that we only wish to defend our own possessions, and not to enter into military competition with the great powers of the Continent. Still, every strategist will tell us that a passive defence is a weakness in itself, and that many parts of the empire could be defended with probability of success neither in England nor in the territory itself which would be in dispute.

Take, for instance, the case of India. I believe you will find that the men who are watching affairs in the East most keenly, because upon the issue of the Eastern question depends their national existence (I mean the statesmen and strategists of Austria), hold the opinion that we shall some day have to fight for our Indian Empire, not in Hindostan, but in the Valley of the Euphrates and on the plains of

Mesopotamia. I give no opinion on this subject, but use it merely as an illustration to show the complicated nature of the problem. Yet this problem must be worked out, or at least stated clearly, before we can tell what our Autumn Manœuvres should be. For, gentlemen, you will I hope agree with me that we have now reached a platform where we may stand for a moment, take off our hats to foreign armies, and say politely, "A thousand thanks for your kind advice, "assistance, and example so far; henceforth our roads do not lie quite "in the same direction."

It is impossible to devise schemes of military organisation and instruction, and get them adopted, or at least carried out to vital results, unless the peculiarities and prejudices of the men and women composing the nation be taken into account. Prussia adopted the system of general service, and made military strength the chief object of all her legislation. When? After she had been beaten and all but destroyed. Austria followed her example. When? After her awful lesson in 1866. France is now doing the same, or something very like it. If there is ever a successful invasion of England we shall not rest till we have created a system and an organisation, giving us military strength far beyond our requirements. At present, though we know not why, and certainly have no fear of military despotism, we are influenced by traditions of parliaments violently dissolved by Cromwell's soldiers, and again by soldiers after his death, of the atrocities committed by "Kirke's Lambs" in the time of James II., and of the mutiny of William's men at Ipswich, which brought about the passing of the first Mutiny Act.

So in proposing measures for forming and training a strong national army, it would be folly to forget that Englishmen are for ever thanking Heaven that they are not as foreigners are, and especially as those publicans the French and Germans. On the other hand it would be equally foolish to ignore the fact that we are a fierce and proud people, sprung from a race of warriors, and that, even of late years, the Government has had its hands full in taming, on certain occasions, the warlike spirit of the nation. Surely, then, we shall do well to be content with an army of moderate dimensions, while we should be culpable if we did not determine so to train that army with its reserves that, counting on the splendid and soldier-like spirit of the men, we may assure ourselves they are more than a match, man to man, for the troops of any other power. No doubt this feeling now exists in England, and, with its growth, has come also the acceptance of the principle that dull barrack-square drills are not preparation enough for war; that soldiers have something more to learn than how to face death and ignore defeat; that the science of war has been developed of late years to an extraordinary extent; and that we must not put off the study of it till the day of trial. The nation created its army, and all the world admired its perfect appearance and passive discipline. The nation began lately to love its army, and only then discovered that, like the offspring of Pygmalion's genius, it was cold and pulseless; I say it *was* pulseless, for it is so no longer. The spirit of progress animates it, and in response to the demand of the country the life-blood of intelligence is coursing through its veins.

Our military schools are improved and active. Our drills are now considered as means, and not as an end in themselves. Over all the country we read of small bodies set in array against each other, instead of opposite a brick wall, and we have already had our "Autumn Manœuvres," which were so successful that they have become as much an institution of England as Parliament itself. There was not a little about them seeming to challenge criticism, but that criticism has been so freely expressed, and taken in so good a spirit, that we may safely refrain from remarks on the past, and rather turn our attention to the future. It has been the will of the Council of this Institution that I should play the jackal to the lions' feast, and point out some game for those who are much wiser and stronger than myself to hunt down. It seems, therefore, better to employ a few minutes in speaking of what may be, rather than of what has been. So many things may come to pass if we will only let them. There are special English difficulties, it is true, but also special English facilities, and is it not a little weak to harp for ever on the former, and never try to get one strong tone out of the latter?

It is said that England is so highly cultivated and so rich that it is hard to find waste lands for large autumn manœuvres. Cannot, then, this rich and mighty country afford to pay for the training of its protectors, even if land not so very waste be selected? Just think for one moment of the absurdity of grumbling about the expense of such manœuvres. Why, the results of an income tax of one penny in the pound for one year, if invested, would pay for the autumn training of the English Army for ever and ever, including compensation to farmers.

It is said, "Rich men don't like to have their shooting disturbed, "and farmers and labourers are so independent." This is frequently asserted; but is it not fair to reply that the English gentleman holds his title to the name on an implied, if not an expressed, tenure of ready service to his country and high example to his tenantry? Was it only in the breasts of poor sailors that a fruitful soil was found for Nelson's signal, "England expects *every* man to do his duty?"

We are going to educate all our workmen and labourers, to open their eyes to their own power, and to increase that power by knowledge. Is it not rather a serious question whether country gentlemen mean to set them an example of self-denial and patriotism, or of dogged and stupid selfishness?

Hodge is capable enough of cultivating certain sentiments. When we get him in the Army he soon acquires *esprit de corps*. Cannot the country gentleman teach him, especially by example, the idea of duty owing to his country? If not, it seems to me that there is a bad prospect for country gentlemen when Hodge becomes sharp enough to be dangerous.

But we may take it for granted that the country gentlemen will be wise and duty-loving, and that we shall have autumn manœuvres regularly.

The next question is, How best to turn them to account?

The first point to which I crave your attention is the necessity for

systematic preparation before the autumn manœuvres, in order that no time may be lost when the camp is formed. Every regiment, every Officer, and every man should go to the manœuvres knowing, each one in his own sphere, how to perform whatever may be required of him. Let it be granted, for instance, that all men in an infantry regiment know how to march well, to perform all the parade movements with perfect regularity, to skirmish according to the drill book, and to perform ordinary outpost duties. They are just ready to begin their real instruction for war, or their preparation for autumn manœuvres. Let us set down a few of the subjects to be studied at this stage by companies and battalions, not waiting for formation into brigades and divisions, for it is then too late to learn minor details. Only first hear some passages written by an Officer in the Prussian Army about the French just before the war of 1870. They are very striking and instructive if we read them aright. Baron von Ludinghausen, after finding fault with the French for not giving Captains of companies enough liberty of action in training their own men, proceeds, "The superior Officers, like the Captains, in France have not nearly "the liberty of action and the initiative which are permitted amongst "us." On this point the Baron harps again and again—the stupidity engendered by over centralisation instead of giving each Officer his own responsibility. He adds, "The exercises of field service, having "for their object the fight on rough ground and around positions, and "special localities, the service of outposts, service on the march, finally "certain minor operations of war (ambuscades, surprises, escorts or "attacks of convoys), &c., are much more rarely practised in France "than among ourselves. Further, they are much less instructive, "since they are never made with two detachments operating one "against another, hardly even against a pretended enemy. Besides" (I pray you to mark this) "the French fancy that because of their "natural military aptitude such exercises are only necessary in a "minimum proportion, being convinced that the want of practice will "not hinder them from doing wonders in the field."

Now for a few of the practical details to be worked out by small bodies of men before they are fit to be brigaded together with hope of really useful instruction.

First.—Place them on ground such as men fight over, not a beautifully levelled parade, and teach them how to act on the defensive. Show them the advantage of being themselves concealed, while they have in front of them a free space over which the enemy must advance—how to combine the action of dispersed troops with that of troops in ranks—the necessity of studying the ground in front of them—how they might be supported by other infantry, by guns, and by cavalry. Practise this for some time carefully.

Second.—Show them how an enemy placed as they themselves were should be attacked, both on open and on close country.

Third.—Choose a position as strong by nature as can be found, strengthen it further by art, and show them how the force should be distributed most economically, how the flanks should be protected, and the best position for the reserve.

Fourth.—Attack the same position, supposing either that the force employed is alone or is only the advance guard of a stronger body.

Fifth.—How to fight in retreat on different kinds of ground, either when relinquishing a position or foiled in the attack upon one—action as a rear guard—positions of refuge—how skirmishers can cover a retreat, and what kind of fire is best to be employed—how and when to retake the offensive. Show them the necessity for covering the line of retreat.

Sixth.—Practice receiving cavalry, when skirmishing in line, or in column—choice of position to receive strong bodies of cavalry.

Seventh.—Attack and defence of woods, pointing out the advantage of holding the outskirts and roads with great vigour; how the interior should be held and communications so maintained that isolated detachments may not be cut off; difference between mere covers and forests; how to march through a forest where the enemy may be; difference between the action of an isolated body and an advance guard crossing wooded territory.

Eighth.—Defence and attack of defiles, holding the front of the defile, the rear of it, or the interior; attacking an enemy posted in these several positions.

Ninth.—Fights in inhabited places, such as farms, villages, and unfortified towns; placing buildings in a state of defence; breaking up or holding vigorously the entrances and issues; the struggle within houses; street fighting; how a small force of trained soldiers can defend themselves against insurrection from the inhabitants of an occupied town.

Tenth.—Field works—how to make them, defend them, retreat from them; when and how to occupy the ground in front. How to place the reserves. Building and defence of block-houses. Attack of field-works—how to reconnoitre them; to envelop them with skirmishers or swarms; to use groups of workmen for demolishing them; the rare occasions on which they can be attacked in column or in line.

This is a formidable, though still incomplete, list of minor operations which may fairly be taught to every regiment in the service, and ought to be taught to it before pretending to undertake either autumn manœuvres or war. It is not original, and some of you may know whence I obtained it.*

All these things having been thoroughly explained to bodies of infantry acting by themselves, it remains to practise them in small and handy numbers working against each other, in combination with different proportions of cavalry and artillery, and you may then add to them the crossing of streams and of rivers, with the defence of the same.

Now, is there anything in all this which Officers and soldiers may not fairly be expected to have at their fingers' ends? We may go

* Such lists are to be found in the index to many a foreign book on war. This one happened to present itself, just when wanted, in that most excellent and useful French journal, the "Revue Militaire de l'Etranger," which is a cheap and very valuable summary of military doings throughout Europe. It appears every fifth day. I get my copy through Mitchell.

further and ask, is not all this fifty times more interesting and more likely to develop a true military spirit, together with the soundest discipline, than all the marchings and counter-marchings on level ground that ever were heard of? Can anything be conceived more likely to make the troops cheerful and to develop that feeling of self-respect, without which no man is more than half a soldier? The terrible mistake we too often make in England is to suppose that only Staff Officers need know all these things. In the famous *brochure*, "The Battle of Dorking," the author has shown a marvellous instinct (if indeed it be true that he never saw the Prussians fight) in representing the English Volunteers as defending their position bravely, though without understanding, till suddenly they found the enemy leaping down among them where they were not expected. Pray do not believe those careless people who represent the Prussian mode of fighting to be invariably in heavy columns. That plan was tried by them at the beginning of the war, just as smooth-bored field guns were tried in 1866. All the results told against the smooth-bores and the heavy columns. The former were withdrawn from the field at Koniggrätz, the latter dissolved themselves into swarms. There is now not a smooth-bore field piece in the Prussian Army, and the attack by swarms of skirmishers is now the rule—not the exception. Swarms enveloping any stiff formation opposed to them, whether column or line, stinging it into mad terror and breaking of ranks, while the swarms are drawn together in groups for a rush against any weak point, if an Officer do but call them round him by well-known signal.

Such opportunities are sure to occur, and to pass as quickly if the leaders of small bodies are afraid to take responsibility on themselves and must wait for orders from a General before acting. But to avail themselves of opportunities they must have full confidence in their own resources. They must be able to read a battle as a book, and how can they read without having been taught beforehand?

Here we find ourselves in presence of a question which I confess to approach with great misgiving as to the reception of what must in all truth and honesty be said. I hold that the grand British line, with its steadiness, its stolidity, and its noble traditions, is no longer applicable to modern warfare, or at least can only be regarded as quite subordinate to the attack by swarms of skirmishers well supported. Neither line nor column can advance across the open in the face of breech-loaders and mitrailleuses, and no formation is less able to take advantage of broken ground than a trim, well-ranged line. It must break its ranks, and then it is the *British* line no longer.

Wellington claimed for line over column certain advantages when the line was composed of steady Englishmen. Exactly the same advantages under the new conditions of warfare, has the well-trained and steady swarm of skirmishers, now distributed, now in groups for attack, over the formation in line. Pray do not reject this opinion as the insolent dogma of a lover of change. If Wellington were here now he would see in it but the legitimate development of his own principles and his own faith in the steadiness of the British soldier. So surely as

men go into action in line so surely will they have to break their ranks or remain useless. Is it not better to let such breaking up of formation take place according to a well-known and carefully arranged plan, so that there may be no loss of confidence, and the soldiers may feel "This is nothing unexpected; we have been trained to it, and know what to do?" What the line is to the column that is the looser formation to the line, requiring even steadier and better taught troops. The old arguments of Wellington might be used almost without alteration in favour of the proposed development of his principles.

The reasons why the change is called for are two-sided, but come directly from the improved range and rapidity of fire possessed by modern weapons. In the first place, no line advancing with the steady pace at which alone a line can advance could possibly remain unbroken if the enemy be but moderately steady; and in the second place, skirmishers or swarms are as safe against cavalry as ever a line was, and can deliver an even more deadly fire than a line could with the same weapons. Therefore both safety and economy of men are concerned in favour of the change. The question should be settled soon, because the training of the soldier in shooting is seriously affected by it. There is a controversy now proceeding in Germany whether the bayonet, always fixed as it is now, should be retained, or a sword-bayonet—to be worn by the man's side and only fixed in emergencies—should be substituted. In the course of the dispute there has been unmistakably shown the opinion, now almost universal, that trained infantry can fight as steadily and do as much execution in extended order as they could formerly in column or line. Let us hope that no veneration for existing systems may prevent the speedy settlement of this question, which is, I believe, the most important one of the day.

The next subject I would lay before you for consideration is, How to get the best possible information of the enemy's doings. Spies are all very well in their way, but they cannot come in from hour to hour and tell you what dispositions the enemy is making, especially in the midst of a battle. Here again we are particularly fortunate in the character of our troops. Just as the English infantry soldier may be trusted, before all others, to act boldly without feeling the touch of comrades on either side, so the English cavalry, with their splendid courage and good riding, may be trusted to dash into the very midst of an enemy and bring back information. I propose that, besides their regular outpost and patrol duties—besides their skirmishing—they be used, during the fight itself, in small parties of half-a-dozen or so to make raids, wild rides in fact, for no other purpose than to get information. I can vouch for the fact from personal experience, that English cavalry can catch this idea, and, with a little practice, act admirably in the manner proposed. They must make a bold rush in a certain direction, break up like a shell in the presence of the enemy, and get back—some of them at least—with intelligence. They are sure not to be all killed or caught, and a Victoria Cross would be well earned in war by clever daring in such achievements. Grumblers are apt to say that modern arms are driving all the chivalry out of war. Never was there a falser supposition, and never was there a time when

cavalry were of more value than now, if only they are used freely and for proper purposes. Cavalry can learn such work best during the year by the manœuvres of small bodies against each other, and show their mettle in the autumn. But to try them thoroughly it is necessary that our mimic war should not cease with the Umpire's decision each day of the manœuvres. One of the chief advantages possessed by the Prussians over the French in the late war was their admirable use of cavalry to conceal their own movements and to discover those of the enemy at all times—not only during actual engagements. What is there to hinder cavalry from performing a little night work during the summer months? The chief objection appears to be the damage likely to result to the men's uniforms. This leads to another proposal I venture to make, namely, That a dark-coloured blouse, somewhat similar to a Norfolk jacket, with pockets, be adopted as the costume for all troops during manœuvres, and that the men be forgiven if the jackets are not always so trim and unstained as their tunics. We are to be a hard-working Army, and we need not be ashamed if, on special occasions, men and Officers bear about them some of the marks of work. Already the late manœuvres have settled the adoption of the long boot for mounted men. It is only to go one step further and decide on a regular fighting costume for campaigns as well as manœuvres. The patrol jacket is not quite the thing, though I can vouch for its comfort, having worn it, both during a summer and a winter campaign. One more word on equipment for your discussion, if it so please you. Cannot we now get settled for evermore what is the least amount of kit that soldiers want in the field for a few days, or even weeks? The advantage of light equipment can hardly be over-estimated. With Norfolk jacket, cloak, a pair of shoes, and a well-filled haversack, I see no necessity for carrying knapsacks and valises. They might be left always some marches behind an army, being certainly less needful than the third reserve of ammunition.

So far we have spoken chiefly of infantry and cavalry separately. Their action can be easily observed, and the Umpire's decisions regarding them are not difficult. The use of artillery during the manœuvres is not so simple. It is easy to say that they should do exactly what they would in war, but the difficulty is, how are they to make the presence of their fire known? We may take it as pretty well established, that guns should not go closer to the enemy than 800 or 900 yards as a rule, and that an extra 400 or 500 yards' range anywhere between 900 and 2,000 yards, is of little account compared with the occupation of a favourable position. But it happened frequently during the manœuvres of last year, that guns were in action against an enemy who entirely ignored them. I see no remedy for this but attaching an assistant Umpire to each battery, who should call the attention of the enemy to the fire which is being poured upon him. The message would not be as rapidly conveyed as that borne on the wings of a projectile, but it would at least be of some value, and add to the usefulness of the manœuvres.

You will recollect that last autumn an order was issued by the Com-

mander-in-Chief freeing the action of the guns, and thereby enabling them to make their full power available; but there seem to have been some exaggerated ideas on the subject, and, being an artilleryman myself, I cannot be accused of retrograde opinions if I endeavour to show that the freedom of artillery may be overdone. It would be madness to suffer Officers commanding batteries to wander about the field taking up positions and firing at such portions of the enemy's forces as seems good to them without reference to the Commanders of divisions. The wisest course seems to be this: The General of division should communicate either through the artillery Colonel on his Staff or directly to Officers commanding batteries what he intends to do, and either order them simply to support him, when the whole responsibility would be theirs, or to concentrate their fire on a certain object, when, for the moment, their only responsibilities would be the selection of positions, the choice of projectiles, and the rate of fire. As a rule, the latter would appear to be the best course, for, while it is an axiom that the fire of artillery should be concentrated on the most important point, no one knows at the moment so well as the General what he considers that most important point to be. On the other hand, the artillery Officers know by personal observation and acquaintance with the powers of their arm how best to give effect to the General's wishes, and they ought to have the right and responsibility of acting for themselves in emergencies, even to the extent of directing their fire on a new object. Again, field batteries should certainly not go into action and crawl about with a whole line of ammunition waggons close to them, and as much exposed to fire as the guns. Field batteries cannot work with the speed of horse artillery, but they may at least avoid the opposite extreme.

While treating of artillery alone in its place at manœuvres, I cannot but ask, "Where are the mitrailleurs and the range-finders?" Of the latter it may be said that their value has been proved abundantly, that they save ammunition from being wasted, and increase largely the effect of artillery fire by adding to its certainty. No one who has stood under French shrapnel fire, and seen shell after shell burst innocuously far over head, seen also the Germans laughing at them and rising every moment in confidence as to their own superiority, could have one doubt on the subject. And we know that, as to mitrailleurs, the French have seen no reason to doubt their value; the Austrians and Russians have got them. The Prussians alone, so far, deny their value in the field, though they admit it for sieges. But the Prussians never admit the value of anything that costs money until they possess it; and I can vouch for the fact, that the soldiers held the French mitrailleuses —unwisely used though they were—in more dread than the French artillery. Let us try a battery or two of them in the field at the manœuvres and we shall soon see the use of them.

Of the supply departments and transport, it is to be remarked that until lately we had no organization (properly so called) of the kind. The departments are new, and all we can say of their action last year is, that they were totally inexperienced, and that they neither performed wonders nor broke down. This year they will be watched carefully

and critically. It seems to me that we ought not to rest satisfied with them till they can feed an army on the march; and we have surely advanced far enough in organization to supply each division from its own base, not all from one common centre. Then there would be no necessity for fixing absolutely day by day beforehand where the camp is to be without reference to success or failure. In this case again, it is vain to quote English difficulties without quoting also English facilities. Perhaps the Supply Departments may win their spurs this time. We shall see. It seems to me that their work all the year round ought to be assimilated more to the supply of troops in the field, and I believe that both efficiency and economy would be promoted thereby.

Hitherto we have spoken of the three arms in their separate action. It remains to say a few words of their combination and action together. Presuming that, this time, the troops will be organised into brigades and divisions, with definite proportions of infantry, cavalry, and artillery, and a definite number of guns told off as reserve, and that the supply departments will be able to ensure these divisions freedom in action; furthermore, that all the subordinate Officers and the staff know their work thoroughly; then why not divide the forces equally, and leave them free for some days (except so far as they are bound by the umpire's decisions) or until one side or other is distinctly defeated? One side must win in every game, and it is a special characteristic of Englishmen that they know how to take a defeat with equanimity. Surely there would be more satisfaction in fighting a mimic battle to the end, and then the General who is worsted showing that he knows how to retreat steadily, than in leaving the decision open for everlasting controversy.

Besides, how else are the troops to practise pursuits and retreats, unless, indeed, one force be ordered to consider itself beaten at the beginning of a day, and to retire before a pursuing enemy? Many a General has lost a battle, but restored the fortunes of the campaign by his good dispositions afterwards. Again, the use of cavalry is specially shown in checking a pursuer or in pursuing. No one can complain that last year the battles were for the most part but a series of field days on a large scale. Everybody was new to the work. This year something higher might be tried, even though the manœuvres are confined to the plains of Salisbury, and the "streak of silver sea" treated as though it did not exist.

We all need special practice of outpost duty: dull work when there is no enemy to watch, as alone the French have practised it according to the quotation I read at the beginning of the lecture; intensely interesting if an enemy be in front, even though he be but a friend in disguise. The excitement of deer-stalking is not the final shot, but the approach—when man's brains are pitted against animal instinct, and cool calculation against senses sharpened by life on the heather or in the forest. So it may be at the manœuvres;—the whole game so intensely interesting, that the players forget themselves in the sport, and are content though the first days of September are slipping by, and not a partridge yet slain by their hands. This cannot be done so long as an hour is named for the commencement of operations each morning, and a particular spot told off for encampment in the evening. It was wise

to place these restrictions on the troops last year, for the whole affair was new to most of those concerned. This time we may safely take a further step. I plead for only one at present, namely, to let the manœuvres be fairly worked out by those concerned without interference, until interference becomes necessary for special reasons. If such freedom be given, each army will have to protect itself by a complete system of outposts at night as well as by day. There will be scope for carefully considered tactical combinations, for flanking movements, for construction of field works, for pursuits and retreats; even, I hope, for attack and defence of convoys. The supply departments will be fully tested, and all who are engaged will learn a great deal. They will have to take a great deal of trouble, but how can we hope for success in war if we do not take trouble to prepare it in peace. If we were never going to have war again, I should say, why keep an army at all? But the day for that foolish notion is past. We know that we are never safe from the chance of war. How reckless should we be then—we soldiers, and how unfit to be trusted with the honour of our country, if we were to allow considerations of personal comfort to stand between us and the knowledge which is undoubtedly necessary for success in war. I am often met, when advocating such manœuvres as these I now propose, by the reply, "You don't consider how the men's "clothes will be stained by anything like bivouac work." I might answer, "Has then a tailor-demon taken possession of the British Army, "and is it prepared deliberately to sacrifice efficiency to coats and "breeches?" But I believe that no such spirit possesses the Army generally, and that the men would give a sigh of relief, and stretch their liberated limbs with delight if they were given a comfortable dress, and told that they were not to put on their tunics again till the final parade after the manœuvres.

Only the other day, when we had a little manœuvre at Ipswich, and my men had to march out through a drizzle in order to be at Woodbridge by half-past eight in the morning, I gave them choice of cloaking or not. Through their non-commissioned Officers, they all expressed their wish to remain as they were. Again in the afternoon, when the manœuvres were over, and our tents were pitched, there came down a tremendous shower, hail and rain. I saw many of the men standing out in it, many more than were necessary for care of the horses. I asked them, "Why don't you get into the tents?" The answer with a cheery smile was, "We don't mind the rain, Sir. Let the civilians "get under the tents." Now I maintain that this is the real feeling of the typical British soldier, and that it takes more trouble to put the tailor spirit into him than it would do to teach him everything that soldiers ought to know and do. Therefore I believe he would hail with satisfaction a little additional roughness of life during the manœuvres, provided always he saw the sense of it, and was not called upon to pay for extra clothes. That would be a little hard on the married men.

All, then, I pray for as to the combined action of the three arms is, that more liberty be given this time. Then everything will come right by degrees, as it would during a campaign if only the enemy gave time for practice and re-arrangement.

With regard to the Umpire Staff, Officers present at the manœuvres last year seemed pretty unanimous in the opinion that the umpires should be distinctly attached to particular portions of the force, so that no important event could happen without the presence of some one to give a decision upon it. Again, each umpire requires well mounted assistants or deputies to bring him intelligence, carry messages, or decide minor points in the absence of his chief. These assistants might remain always present with the brigade to which they are attached. Then, whether an operation were performed by day or night, far or near, there would be some responsible neutral on the spot to give an account of it.

Recapitulation.

Let us now recapitulate the subjects I have brought before you so far, still supposing that we have only ordinary land manœuvres like any other nation.

1st. It is absurd to devote ourselves to getting rich without taking care to protect our riches. The richer we get the more protection we need. Without desiring war we must be always prepared for it.

Autumn manœuvres are one of the most necessary steps in preparation, and the cost of them is as nothing compared with their usefulness.

2nd. It is a simple duty for country gentlemen, from whose families, by-the-by, most of our Officers come, to help such manœuvres, even at the cost occasionally of a few partridges.

3rd. The manœuvres will not have half their proper usefulness unless preparation be made for them during the year. In short, the whole system of drills needs revision. Every regiment or battalion, and every battery, ought to be instructed in the minor operations of war. Garrison field days should have the same object, and that abomination, called in popular language the "Sham Fight," where all is sham and nothing is less like fighting, be abolished as a pestilent nuisance. All drills should suppose the presence of an enemy, and all instruction to the men be given distinctly with a view to war, not how to get into Hyde Park and out again.

4th. In war much often hangs on the decision and knowledge of junior Officers. Hence the more responsibility can be carried down to the inferior ranks, and the less it is centralised, the better for the service, therefore the better for the country.

5th. However painful it may be, we must meet the fact that open advances in line, and open resistance by men standing boldly upright in line, is now as impossible to the English as to any other nation. On the other hand, no other troops are so gifted by nature as the English with qualities which will insure success in the new fashion of combat—swarm formation,* and with the new weapons, breechloading, long-

* Inkermann seems to have been fought by our troops in loose order, though they were untrained to it. Because the men who captured the Redan were untrained to such fighting, they knew not what to do when all formation was, of necessity, destroyed.

ranging rifles, and rifled field guns. Therefore, we should cultivate the new method with the utmost assiduity, and practise it at the manœuvres.

6th. No time should be lost, no trouble spared in working cavalry, so as to get the best information. We want an "Intelligence Department" in the British service. When it is established, some of its Officers should attend all the manœuvres, and be responsible that the Generals are well informed. No Officer requires more careful training than the Cavalry Officer. Outpost duties should be practised everywhere during the summer.

7th. The tailor-demon must be driven out wherever he has got a footing. A special fighting jacket, with pockets, should be issued to the troops, to be worn at all practical manœuvres during the year. Advantage should be taken of the autumn manœuvres to discover and lay down the lightest possible equipment for the British Army. This is a great subject in itself.

8th. Messengers of some sort are required at the manœuvres to claim effect for artillery fire. Mitrailleurs and range-finders are imperatively demanded by modern requirements. We have the only good mitrailleur—the only range-finder at all; both of them should be issued and tried at the manœuvres.

9th. The supply departments should be used this year just as they would be in actual war. If they have the disadvantage of being hampered by English customs, they have, on the other hand, English roads and railways. The two opposite forces at the manœuvres should be separately organized, and separately supplied.

10th. The opposing armies should be left as free as possible, and for as long as may be without confusion. The Generals should get their own intelligence, and form their own plans. Pursuits and retreats should be practised. Outpost duty should be insisted upon with the utmost rigour, encamping grounds being marked on the map. Generals should have freedom to encamp on any one of them at pleasure.

11th. Umpires, furnished with assistants, should be attached to particular portions of the forces. If the umpires are required at head quarters the assistants should remain with the camps.

12th. The principle of having a chief of the Staff to each division should be adopted at once, applied to districts or large garrisons, and carried into full effect at the Autumn Manœuvres.

I have reserved to the last, though I am far from thinking it is the least important, a subject to which I now ask your attention.

We Englishmen have been content up to this point of our history to follow for the most part continental ideas about war. This has been natural enough, for most wars, and, therefore, most experience of war, were to be found on the continent. Yet we have always had a natural aptitude for war. In the middle ages we imported the manufacture of gunpowder and the art of war from Italy. In the reign of Henry VII we imported the manufacture of iron ordnance from the low countries. Yet what name was more famous in Italian wars than that of Hawkwood? What guns are now more famous everywhere than the English? What experiments are quoted except ours?

Now we have imported "autumn manœuvres," it will be hard if we don't make all nations come here to learn from us. At the beginning of this lecture I said that we ought to strike out a line of our own. For your discussion I propose what I think that line ought to be. We have lately heard little of any subject except army reorganisation, but we must not forget that we are a maritime nation. Not a mouse can creep out, not a giant can enter without being forced to undergo the trouble of embarkation and disembarkation, and frequently to suffer the pangs of sea-sickness. The sea is our first line of defence, it is also a barrier which might in certain cases shut us in when we would fain go out. It seems, therefore, our manifest duty, as it is certainly dictated by common sense, to work out thoroughly the subject of embarking and disembarking troops, of coast attack and coast defence. Furthermore, we are a country of railways, and in every scheme of defence our railways must play a prominent part; yet, strange as it may seem, though other armies have regular "railway drill," we have none. Though other nations have in their war offices perfect schemes drawn up for conveyance of troops on different occasions, we are content to leave all such calculations to civilians, and never test them at all, for the volunteer reviews are no test, the railway work being simply the conveyance of infantry alone, without baggage or stores. When the troops were first going to the East in the early part of the war which we call the Crimean war, I used sometimes to go down to the dockyard at Woolwich to watch them embarking, and I can assure you that they often made a precious mess of it, so that at last it came to be a sort of bundling them on board by men from Woolwich, who had the whole business by that time at their fingers' ends. Now we really ought to beat foreigners at railway and ship work, and we might have a good deal of it during the year. For the present our "autumn manœuvres" on their usual scale and system may suffice. In the future we may fairly look for a trial such as I will now attempt to sketch out—always for your discussion.

First, we must make what we have not at present, but foreign nations have, places on all our railways for the embarkation in trains of many troops at once. All that is wanted is an inclined plane *outside* the station, covered with earth so that it may seem natural to horses, rising to the exact height of the railway trucks, and extending to the length of a long train.

Next, we want large, strong, flat bottomed boats for embarkation and disembarkation.

Then, for our special English manœuvre, which all the world would flock to see, let us embark 10,000 men, and send them off under charge of an experienced Admiral, who should have no orders but to choose his own place and disembark them there as quickly and as scientifically as he could, protecting the landing with the guns of the fleet. Nobody in England should be told where he means to land, and we should then learn something about the difficulty of evading an enemy's fleet and landing troops on a hostile shore. Further, we shall know what is the difficulty of watching an enemy's fleet, and of sending troops, horse, foot, and guns, to oppose a landing. For my part I believe, though I

am open to conviction, that, provided the attacking transports can be covered, or can evade the defenders at sea, the landing on a coast is one of the simplest operations in war. I may be wrong, but at least let us not live in a fool's paradise for want of a little experiment. If the attacking forces avoid harbours, and the ends of railways, and attempt a landing at several places at once, I really do not know how they are to be hindered. Why not try? Experiments of this kind are certainly not fruitless. Every such trial is a new interest to both Army and Navy, teaches a thousand arts, opens many closed eyes, shows how every soldier or sailor, whatever be his rank, must accept his share of responsibility, and adds to the growing feeling that the military and naval services of the country are not means invented for foolish men to lead idle lives, but require real honest work for their proper fulfilment, and are honourable just in proportion as they involve mental and bodily exertion and unselfishness.

English Officers and soldiers are always ready to fight and die for their country. It is harder to work for her day by day and to live for her. If we hold the military service honourable, if we flock to it, whatever be the pay, if we soldiers are accustomed to look for and find kindly welcome, respect and honour wherever we go, let us not forget that we have it all simply because when the time of need comes "England expects every man to do his duty."

The CHAIRMAN: Perhaps General Walker, who has had a great deal of experience in matters of this kind, would like to make some observations.

Major-General Beauchamp WALKER: I find, after the admirable lecture of my friend Captain Brackenbury, that I have but little to say; indeed, he has produced every point of interest connected with this very important question. I think, therefore, that I had better confine myself to that about which I know most, viz., the Prussian system. Captain Brackenbury most aptly said, that the basis of manœuvres on an extended scale is a thorough knowledge of our business from the commencement. One reason why I believe the Prussians have shown themselves such signal masters in the art of war is, that they begin by a thorough instruction of their companies and squadrons. Every Captain in the Prussian Service is the man who is responsible for the instruction and management of the body confided to him, whether it is a company or a squadron; and it is that company formation which has led to their great success. The one great question of the day, previous to this war—and in that, I think, Sir William Codrington will agree with me—at the last manœuvres which took place, was, "line or column?" and a very lively discussion it was. But even the line, as we hear from Captain Brackenbury, begins to show that it is hardly up to the requirements of the day; the column manifestly not—that is what we all think of as a column, the regimental column; *that* must simply fail in any attack in the open field at the present day. Where you have to advance in the face of a fire which is effective for twelve hundred yards, it is hardly possible that you can keep together a body of a thousand men in a column of eight companies or divisions, and bring them up to the scratch at last. That has been found simply impracticable, though that was the Prussian system adhered to long after other nations supposed it to be imperfect. They, therefore, fell upon the "company column" formation; and even that has been found in the late war almost too dense for efficiency. It has come now, as Captain Brackenbury said, to the swarm of skirmishers. Perhaps the greatest example which occurred during the war of 1870–71, was the attack of the Prussian guard on St. Privat, the right of the French line, on the 18th of August. I think in less than ten minutes the guard lost over 6,000 men, even advancing in the most extended order which they acknowledged to be effective, which was a line of company-columns joined by skirmishers, supported by half-battalions, and supported further in the rear by another line of battalion columns. Their subsequent

attacks were made almost always in extended order. But you cannot fight in extended order, unless your men are thoroughly in hand, otherwise they become a mere mob, every one fighting for himself. But there is one point which I wish to impress upon everybody here, that, unless you have a thoroughly efficient system of instruction from the very commencement, by which the Captain (or whoever he may be), is the person who has taught his men, who knows every man under him, and is his actual leader, you never can command success. I, therefore, most distinctly enunciate that I believe the foundation of the great success of the Prussian army to be that system which gives great independence (I will not say to the subordinate Officers, for I do not consider a Captain a subordinate Officer, I consider him the most important Officer in the Service), which gives to the Captain, as commander of his company or squadron, the sole care and instruction of the men under him. He knows them, they know him, and, in the moment of trial he calls upon them, and they rely upon the person in whom they have confidence, and who has been their teacher from the very commencement.

General Sir William Codrington: The question that General Walker and Captain Brackenbury have mooted, that of fighting in line, is one of the most important for the British Army. General Walker will remember—I do not know whether Captain Brackenbury knows—that we visited the Prussian Army together, and we saw the system of "company-column" developed in their manœuvres. This was after the war of 1866, and before the war of 1870. I remember frequently having discussions with my friend, and also with Prussian Officers on the question of the advance of the "company-columns" under fire. I remember the very first occasion on which that question struck me as an English Officer: the skirmishers were sent out in advance, namely, one-third of 250 men, which is the number of a company, the remaining two-thirds were in actual column; that is to say, a large column of sections, so large as to be a good mark for artillery at 1,200 yards—I think we were agreed about that.—(General Walker: Quite so.) I remember perfectly in the first attack on the village of Müncheberg that struck me, as an English Officer accustomed to feel that his attack is in line in order to save life and to give the greatest fire from troops when they have the opportunity of giving their fire, it struck one as a dangerous principle to adopt. Not only were those company columns within twenty-five or thirty paces of the skirmishing line (which may or may not have been a little too close for regulation, I am not aware how that is, but the fact was so), but the battalion was also in column, and very nearly the same twenty-five to thirty paces in rear of the company column. The English Officers who were there felt, "what is the enemy's artillery to do if it is placed at the windmill of the village?" which was just on the rise with the ground forming a glacis up to it, when such columns as those, the company column and the battalion column close in rear, are exposed to the active fire of the artillery of the present day. The advance of troops in column under fire was certainly of frequent occurrence in the manœuvres of 1869, in the Prussian Army, and if Major Roerdansz were present, I think he would confirm the fact that it was at that time the habit, or at least very much the habit, during the Prussian manœuvres. What have we heard since during the war of 1870? This very practice that took place in 1869, in peace, took place, I think, in the early part of the war of 1870 in France. I may be wrong, I was not there; but from what one has read subsequently, I think that same system was employed, and General Walker will, perhaps, be able to confirm it or not. But I believe that the Duke of Wurtemburg visited the battle fields of Spicheren, and the battle fields round Metz, in order to see how it was that the enormous losses had taken place in the Prussian Army. I think the facts have borne out the idea, that subsequent to the examination of the result of those actions, a total change took place in the attacks of the Prussian Army; they had attacked in bodies which were exposed to great loss, although the French artillery was not well served, but finding that those losses took place, they took to the skirmishing principle in a much greater degree, and made it the rule of their Service in the latter part of the war of 1870. I speak under correction, but I think I am right in these facts. But now I should like to put to the lecturer this, in any remarks that may be made afterwards. Was there any position of importance, such as at St. Privat or at Rezonville; was there any positive defencible position held by the French that was taken by skirmishers only on the part

of the Prussians? I should rather doubt it. Skirmishing order, good as it may be for its purpose, is surely not that concentrated attack to which at last it must come; and then, if you are not to get your men together either for the purpose of firing or for the purpose of getting to close quarters with bayonets, I think there must be a difficulty in such open order attack. There is no doubt that the original line, what is called the standing-up line of England, may not answer; that is to say, people cannot stand up to be exposed to fire. But I want to know whether it has ever been the practice in the English Army to place men in line, almost according to present ideas, for the purpose of being exposed to fire? In the accounts of wars that one has read, and certainly in some that have taken place of late years, the line did not stand up; but when it was under fire, until the moment of action came, it lay down, and certainly was comparatively little exposed to fire on those occasions. What I want to get at from those who really think that the line is obsolete, is this: In the first place, take the Peninsular war; how was it that the line was so much used by the English Army? Was it not that the Duke of Wellington found that by placing men in line, having confidence in their fire and their steadiness, the fire of the whole was utilized, and would overlap the attack of a column? Therefore, the French armies generally on that account failed in their attacks against the English when they were in line. There is no doubt that is the fact; therefore, don't say the line is obsolete, when it is really a newer system than the column formation of the wars of Napoleon. There are, certainly later wars; still at that time was adopted the principle that holds good now, namely, that a greater quantity of fire can be given from line than from column; and as to exposure to artillery, the line is less exposed to casualties from artillery fire than any column, even a company column. I should like the lecturer to give us an account of the actual attack, at the heights of Spicheren, for instance; this was a steep isolated height looking over a valley. The Prussians advanced. If I remember the ground rightly, the Prussians advanced from Saarbruck down a slope and over a flat of about a mile and a-half or two miles, and then up this very steep height of Spicheren. I want to know how they crossed that open, whether they were exposed to artillery fire, and whether they were exposed to infantry fire, in column, because I believe there they lost a great number of men. There is no doubt that at St. Privat enormous losses took place. I should also be glad to know from the lecturer if he can tell us whether the division of Guards in advance from St. Marie-aux-chênes up that sort of open glacis to St. Privat, attacked in column. The first attack was foiled, but I think the attack succeeded afterwards with a great loss of men. Perhaps he would let us know as to the tactical formation of the troops on those occasions, and if these attacks were made in column exposed to artillery, in preference to attacking in line. That is the point about which I should be glad to get information, because it is a point of tactics more than of strategy, and it is of great importance to the future of the English Army. The pamphlet referred to is that of the Duke of Wurtemburg,—I don't know whether he is a Prussian Officer. (General WALKER: No, he is in the Austrian Service.) I quoted it for this purpose. He went to inquire how it was these losses took place, and it was in consequence of his report that the change in the Prussian system of attack took place.

Major-General Lord MARK KERR: I think I can answer Sir W. Codrington's question. I believe the reason of the excessive loss of life on the German side at St. Privat to be, that they attacked the French, straight along their front, and that their "swarm of skirmishers," to use the phrase of the gallant lecturer, was always too thick a swarm. On their left at St. Marie-aux-Chênes and St. Privat, they were brought up, swarm after swarm—not close enough where they would have been safer—but straight into the range of the French fire, only to be shot down one after another, literally strewing the ground "thick as autumnal leaves that strew the brooks." I believe the turning of the French right to have been a "pensée de l'escalier." The Germans had retired—had certainly ceased to advance for some time, when it was discovered that the French right, though it kept its ground, was without ammunition, and Canrobert, who commanded it, was obliged to retire in his turn. The German tactics were as bad at St. Privat as they were all throughout the war against the French Imperial Army. With overpowering numbers they employed the column covered by these swarms of devoted skirmishers, and they attacked in front. These tactics were changed later.

As I am speaking, I wish to make a remark on the subject of the lecture. There are two ways in which the autumn manœuvres might be of essential service. I mean in the training of our cavalry in outlooking and gaining information—the cavalry is the true intelligence department of the General—and in that of the light infantry skirmisher. But both these were wanting at the late manœuvres. It was a striking sight to witness as I did a line of skirmishers advance (the umpire looking on), and altogether regardless of it, move slowly across the open under a fierce opposing fire of skirmishers skilfully posted behind perfect shelter, and dislodge without loss their opponents, gaining an easy victory against all rules of mimic or real war and common sense. It was a curious sight to see the General of one army for some hours on rising ground surrounded by his staff gazing through telescopes into space in search of his antagonist, with the cavalry—which would have been able to bring him the information better than any number of telescopes—behind him, and while so employed, to hear firing somewhere back on his flank, and on looking for the cause to see it in the prominent features of an opposing General of Brigade gallantly emerging from hostile smoke, who was proudly riding into his midst, while the lines of infantry blazed blank cartridge into one another's faces and into those of the umpires at less than 100 paces distance.

I repeat that neither cavalry *éclaireurs* nor infantry skirmishers were used to any purpose at the late manœuvres. They did not act their part at all. On the particular occasion to which I refer, if the General had employed half a dozen men that could ride and use their eyes, he would have known exactly where the opposing force was. And as to skirmishing, except in the barrack square fashion, as a rule, they did not skirmish at all.

I fear I have spoken too long, but before I sit down I must say that there is one suggestion of the gallant lecturer which I think a famous one, that of the Admiral and his 10,000 men hovering on the coast with full discretion as to his point of attack. I can imagine the pleasing state of anxiety of some of the functionaries in Pall Mall during the carrying out of this plan of testing their departments. I can fancy I see the faces of Quartermaster-General and the Controller-General waiting in suspense as to whether the Admiral would disembark his 10,000 in Torbay or on the coasts of Northumberland or Norfolk.

General WALKER: Sir William Codrington was anxious for information on one or two points, which I think will interest others as well as himself. First, he enquired about the attack on Spicheren. One reason why the Prussians advanced to the attack on Spicheren with such impunity was that the French guns were too far back, drawn up behind the crest attacked; therefore, they got up to the heights without suffering while crossing the plain which lay between Saarbrück and the base of the heights.

Sir WILLIAM CODRINGTON: In column?

General WALKER: Always in column. But I can tell you the exact formation at Weissenburg, which was the first affair of the army I was attached to during the campaign. I saw it very plainly. They attacked in four lines. The first line were the fifth rifles.

The CHAIRMAN: You mean four lines of columns.

General WALKER: No, four continuous lines.

Sir WILLIAM CODRINGTON: The troops deployed.

General WALKER: Yes. The first were the fifth rifles in skirmishing order. The second line, as I am pleased to call it, though it is not what we should call it, were company columns, two companies from each battalion. The third line was formed of half battalions in support, and the reserve was a line of battalions.

General CODRINGTON: In column?

General WALKER: All in columns, except the fifth rifles and the connecting skirmishers of the company columns. That was the order in which they attacked. But they suffered so excessively from going up hill in columns, that they very soon threw the whole of what I will call the second line of company columns, into skirmishing order. They then attacked in two lines of skirmishers, the fifth rifles in front, and the whole of this line of company columns in line of skirmishers behind. The others coming at still greater distances, and holding their ground very carefully, kept out of fire in support and in reserve. Sir William is perfectly right in saying

that the great loss experienced at St. Privat was from their attacking even in the modified form of "company-columns." But I think Duke William of Wurtemburg, who only came out after the battle, and who I hardly think has had the same opportunities of discussing the question since as I have had in Berlin (I only wish I could say all I know on the subject, or rather all that has been said to me), I think he was not quite right in two respects. I think he firstly attributed the whole of the loss, and the subsequent modification of their mode of attack, to the fact of their having attacked in column; and, secondly, I think he was not quite correct in the modification which he declared to have taken place. I am most confidently assured by one of those who commanded on that day, that the great reason of the loss was that the attack was not properly prepared by artillery; it was the improper use of artillery which led to the great loss. And the order issued in the army—(I never heard the order to which Duke William of Wurtemburg alluded)—but the order which I did hear was that no Officer commanding a corps on his peril should presume to attack a position held by the enemy in force, until he had prepared the way by artillery. That was the order issued to the army. I think Duke William of Wurtemburg must have been wrongly informed, or that he caught up an idea a little hastily, because I have had the opportunity of talking about this question until the day I came away from Berlin. But the real truth as to the attack on St. Privat will never be published in the lifetime of any of us; it will never be known. It can hardly be called a repulse. The men lay down until the artillery crushed the French artillery, and it was safe again for them to advance. That I believe is the plain truth, destitute of a great many facts that will never come out in our lifetime.

Lord MARK KERR: The French had no ammunition the latter part of the day.

General WALKER: That may be so. It is only to-day that one reads that Marshal Bazaine's excuse for not showing greater activity while he was shut up in Metz was, that the Army had only one day's ammunition when they were shut up in the fortress. I heard that fact during the campaign, and having seen it published during the last few days, it confirms what I heard at the time.

Sir WILLIAM CODRINGTON: Perhaps you will mention where the French artillery was placed between St. Marie-aux-Chênes and St. Privat, because, if I remember, St. Marie-aux-Chênes was at the bottom of the glacis. Was there any place where the French artillery could command the Prussian troops?

General WALKER: After all, what enabled the Prussians to take St. Privat was the Saxon advance on the village of Roncourt. If the artillery fire (I am only giving an opinion) had been continued until the Saxons had completed their turning movement, there would perhaps have been no necessity for this hazardous attack on St. Privat. But the day was drawing on, and troops do get impatient sometimes when exposed to heavy fire. There is one point which Captain Brackenbury mentioned, and Lord Mark Kerr also, which is very important (and which we must practise in future Autumn Manœuvres in England, because it is the life and soul of the operations of an army in the field); and that is a much larger and more extended use of cavalry than took place last year. The one important fact, beyond that discipline I spoke of before, the one thing during the last war which led to the great success of the Prussians, was the wonderful and unrivalled use which they made of their cavalry. Their cavalry were pushed not only miles, but days' marches ahead. No movement of the enemy was concealed from them, and no movement of their own was revealed to the enemy—they were simply covered by a veil of cavalry. In the old days, when I was a cavalry soldier, it was thought the sole *rôle* of cavalry in war was to execute magnificent charges, headed by their Commanding Officers. That was the only and sole object for which one sweated and drilled during the hot days of summer. I hold that the preservation of the army from surprise, and the discovery of the intentions of the enemy, is a far higher *rôle* for the cavalry soldier to play than that of merely charging in line. I hold that the wonderful intelligence shown by the Prussian cavalry in the late war, the careful organisation of the divisions under their Lieutenant-Generals, the mode in which they harassed the enemy on every point, in which they discovered his every movement, in which they cut his railways, in which they prevented his reinforcements coming up by destroying communications, is a far higher definition of the duties of the cavalry soldier in war than merely charging in line. I do sincerely hope that cavalry soldiers, who think that their day is past,

will take heart by what I say; my belief is that a far greater sphere is open for cavalry now than in the old days when they rushed merely headlong against one another. I believe that our *rôle* in future is the intelligence, the concealment (I won't say the spy, but the *éclaireur*) department of the whole Army.

Major BAYLIS, 36th Middlesex Rifle Volunteers: Will you allow me to make one remark in confirmation of what has fallen from General Walker? I was present at the Autumn Manœuvres last year, and was struck with the absence of the assistance of cavalry, or mounted patroles, in connection with infantry regiments or brigades for the purpose of keeping up communications. &c. I was placed in a position, viz., in command as Captain of a flanking party, when it was reported to me that there were certain of the enemy's cavalry seen on the hills in the distance to the left, and that they had galloped off on seeing us. Being at a great interval from the main body, and not mounted, it was impossible for me to communicate that important information with the rapidity I could have wished. It seems to me that if we had connected with our infantry troops some eight or ten mounted patroles attached to each infantry brigade, who might convey intelligence, they would be of very great use in the service.

Colonel Sir HENRY HAVELOCK, Bart., V.C.: I would ask to be allowed to say a word with regard to the very interesting paper of Captain Brackenbury. One of the points he brought out was that, as we have happily been in the position of by-standers while war has been going on on the Continent, we have had the opportunity of learning at the expense of others. But while ready to profit by the experience of other nations, I think that we should not altogether ignore the fact that at all times in our history, from the earliest down to the present, when a great necessity has arisen, the genius of Englishmen has been equal to the occasion. It is in our traditions of former times that, when we were armed only with the long bow, the English bowmen were superior to those of all the world. In more recent times, we have had the good fortune to develop the powers of the rifle and long range artillery. I don't think we should be doing justice to ourselves if we did not say that our own people will be found equal to the occasion when the occasion arises. In the present instance, the experience of the Prussians only confirms our long cherished liking for line formations. With regard to the attack on St. Privat (the scene of which I had an opportunity of seeing immediately afterwards, though not present at the time of the attack), it resolved itself into the old vexed question of column *versus* line. The Germans had adhered to the column formation to a great extent, although modifying it very much. The column was the prevailing idea of the First Napoleon's formations for attack. The Germans had modified it considerably, adopting to a certain extent our line formation. Theirs was a sort of intermediate formation,—company columns supporting swarms of skirmishers. Their first line in the attack on St. Privat was a swarm of skirmishers; their second line was composed of company columns, but their main body was a line of battalion columns. (General WALKER: That was the very expression I used.) The attack on St. Privat therefore failed, because it was made virtually in successive lines of column, their front line only being composed of skirmishers. In fact, their formation as regards depth was mainly one of column. Now there is an old English formation that I have heard discussed years ago, long before it was spoken of by the Prussians, but which now, since the pamphlet of the Duke of Wurtemburg, seems to be in favour with them also. That is the successive advance of alternate lines, close to each other. One in front, and one in rear, with about 100 yards distance between them; the front line moving at the double for a short distance, and then lying down and firing till overtaken by the rear line, which then passes to the front, and does the same in its turn. It seems to be the prevailing idea now among the Prussians that that may come to be the future formation for attack; that the front line will lie down firing, and that the lines in rear of that need not be formed of columns at all, but of lines in extended order, only separated from each other by a distance of 100 to 150 yards, covering the intermediate distance between lines, at the double, and then immediately lying down to fire. By that means, the line which is behind the skirmishing line, gradually creeping from point to point of cover in that way, can approach the point where its attack is required to be delivered without sustaining any heavy loss. It may, while lying down for two or three minutes just before the final attack, be reinforced by the line in its rear, or

by the two succeeding lines in rear, so that the point of attack can be finally approached in as close formation as if the troops had advanced in column, while from the advance being really made in line, the troops hardly sustain any loss at all. Captain Brackenbury remarked that the movements of the cavalry at the last Autumn Manœuvres were open to criticism. But I don't think he did quite justice there to all the cavalry. For though the position on Fox Hills was crept up to, on the last day's fight, without the cavalry on the defending side giving any information to their General, still that very fact presupposes that the cavalry on the other side acted in the Prussian way of entirely masking the movements of their line until it was able to make a sudden successful attack. There is an Officer here, who I daresay would not like to have his name mentioned; but if he were at liberty to tell us in detail what the cavalry orders on the attacking side were, I think we should hear that the cavalry on that side did exactly what the Prussian cavalry did, only on a smaller scale, that is to say, that they were thrown out four or five miles in advance of their force, and that they screened completely the movements of their own side, until the troops behind them were able to advance and throw themselves unexpectedly upon the enemy's unprotected flank.

Captain BRACKENBURY: I have only a very few words to say in reply to the various remarks which have been made. With regard to most of the discussion, I think there is no reason that I should say anything at all, as most of the speakers supported my views. Sir William Codrington asked several questions about the attack on St. Privat. All those questions have been answered by General Walker. With regard to the attack on Spicheren, I believe that the Prussian advance across the valley was rendered easier than it would otherwise have been by the fact that the French were not provided with sufficient artillery; they had a very small proportionate force of artillery there, and the attack of the Prussians was therefore easy. Yet even on that occasion the attack was not successful until the flank of the French was turned. I think if we refer to the battles throughout the course of the war, we shall find that direct attacks upon positions in column or in line of company columns, were always unsuccessful, even when they had been prepared by artillery fire, until a flanking movement was made, sometimes by artillery only, sometimes by infantry, obliging the defenders to abandon their defensive lines of works. I believe such to have been the case as far as I have been able to ascertain by reading. I am sorry to say I was not there to see the first part of the war. Three special questions have been referred to in the discussion. First as to the fighting of cavalry, and their action in the past manœuvres, especially on the last day, the battle of Fox Hills. I do not think anything I said could fairly be taken as reflecting against the cavalry which advanced that day, still less against the brigade to which I had the honour to be attached at the time as Assistant-Umpire. I never saw anything more splendid in any warfare than the dash of the squadron of the 10th Hussars up that road into the middle of General Staveley's position. Rash it may have been, but the fact was that those men succeeded in going up to the plateau, and, as I rode up with them, I can vouch for the fact that though some of them would not have come back, they would have done the very work that I want to see cavalry do. They rode rapidly up the road to the top into the middle of the enemy's position; they would have come down *with information*, those of them who did come down, only they should never have been allowed such a chance. The action of cavalry should be dictated and supervised by the highest intelligence. No one requires more intelligence and knowledge of war than the cavalry Officer and the cavalry soldier. The kind of action which is now required of cavalry appears to me to be more chivalrous than the charges in mass which they had to make in the late wars; because now every man must be individually brave and wise; and the *rôle* which is proposed for them in future war is so much above the *rôle* which they have lately considered theirs, as the wit of a gentleman is above that of a clown. Some gentleman referred to the infantry requiring cavalry to be near them to give information of what was going on. Cavalry should be patrolling all the roads in front of infantry, but their information must go to the General or Brigade Commander. The Prussians always had large numbers of cavalry out in front of their Army; and, as General Walker remarks, not only miles but days' marches in front, while between them and the Army lines of communication were kept up, along which knowledge was always passing. We must

in our manœuvres employ cavalry in the same way. But you cannot do it unless you have the two forces really manœuvring against each other—really getting information about each other; and, therefore, really acting as they would act in war. That is the only way to learn it. The second question I must notice was raised by Sir Henry Havelock, who said that the spirit of Englishmen would always be equal to the occasion, and their genius must be trusted to. I perfectly agree with him; but that is no reason why genius should be left uncultivated. The English have a genius for war; but we all know what becomes of genius, very often, when it is left to lie fallow. Without cultivation it produces only worthless weeds. Thirdly, with regard to this action of infantry in line and column. The only part of the war in which I was allowed to be present was the latter part. I was with Prince Frederick Charles on his attack on Le Mans, and, in order to learn as much as possible, I went with the advanced guards, and with the soldiers when making their attacks, so as really to see what were the latest ideas on tactics in the field. The work was done almost entirely by skirmishers. During the advance from Vendome, at the battle of Changé, and the three days' fighting before Le Mans, the same thing took place. The fire of the French was so awful that it was perfectly impossible for troops in any formation to live under it, though the French soldiers aimed very badly. In woods occupied by the Prussians, every tree had several bullet marks in it, and it would have been perfectly impossible for any thing in formation to have lived under such a storm. The only way in which the Prussians did live was by advancing in very loose order, by throwing themselves down, by dodging behind every hedge and bank, assembling in groups behind a house or little hill, and creeping on bit by bit as they could. Then, when they came near the enemy, the Captain of the company *who knew his men*, as General Walker said, saw his opportunity, seized it, and, calling his men to him, dashed in at that place. The moment he was in, that moment the French ran. I believe that some such system of advance is most likely to be adopted of necessity in the warfare of the future. Some one said that our lines would not stand up exposed to fire in war; but they certainly did stand up at the manœuvres. It was rather painful to see them sometimes, because they were being practically taught to consider that it is a grand thing, a brave thing, and a right thing for soldiers to stand up and face their enemy. Then, when it comes to war, they will find that they cannot stand up and face their enemy. They must lie down. They will say, "Here is all our bravery "gone! What our Officers have taught us is impossible." Now, if they were told from the beginning, "War is so changed that it is not the right thing to stand up, "you must now lie down, you must creep, you must make a different kind of business "of it;" the moment they go into war they say, "This is what we expected; the "fire is very hot; we are ordered to lie down, to creep." In fact, to avoid future demoralisation, I am anxious not to have at our manœuvres what we should not have in war, lest our time and money should be worse than wasted. I think those are all the points that I need refer to.

The CHAIRMAN: On behalf of this meeting, I propose a vote of thanks to the Lecturer for his very able paper.

NOTE.—By permission of the Council, I would add one word. Some Officers appear to think that the only substitute for the line is the column. I do not advocate a return to column formations under fire, but a development of the line, by using extended order for all attacks. I dread improvised looseness (like that of the French) before an enemy, and am anxious that the advance in extended order—not a mere line of skirmishers—should be carefully practised in peace, because it is inevitable in war. Then there will be no opening left for "looseness."—C. B. B.

LECTURE.

Friday, May 3rd, 1872.

MAJOR-GENERAL W. C. E. NAPIER, Director-General of Military Education, in the Chair.

ENGLISH AND FOREIGN MAPS AND THEIR USE FOR MILITARY PURPOSES.

By Captain CHARLES W. WILSON, R.E., Director Topographical and Statistical Department, War Office.

AMONGST the points connected with the recent war between France and Germany which attracted considerable attention at the time, were the supply of maps to the German Army, and the good use that was made of them. It is hardly necessary to mention that the popular belief, that every Uhlan rode about with a map in his hand, is incorrect. There appears to have been a liberal supply of maps, and what is far more to the purpose, the Officers in whose hands they were placed, knew how to make the best use of them. As an instance of this, it is only necessary to refer to Captain Brackenbury's description of the Prussian Officer, who, with the aid of a map, led his men without the least hesitation through an intricate district in Brittany that he had never visited before. The maps used by the Germans were reproductions of the Government maps of France, on the $\frac{1}{80000}$ and $\frac{1}{320000}$ scales, 0·792″ and 0·198″ to a mile.

Last year, whilst the general interest in military maps, created by the war, was still fresh, a map of the vicinity of Aldershot was prepared for the use of the troops during the autumn manœuvres, and a large number of copies supplied. It was only natural that the first map of any portion of this country which had been specially issued for what may be called "use in the field" should be freely criticised, and it was equally natural to expect that it would not please every one. Some objected to its scale and its colouring, whilst others complained of its want of accuracy and unsuitability for military purposes; in fact, there was no part of the map which was not attacked.

As any unfavourable comments on this map may be supposed to reflect, to a certain extent, on the character of the 1-inch map of England, of a portion of which it was a reproduction, it seems desirable to give those who take an interest in the question an opportunity of comparing the maps of foreign countries with those of our own. Such

a comparison is the best method of removing the false impression that England is not still in advance of continental nations in the art and practice of accurate map-making, and the following paper will, it is hoped, show that many of the objections to the Aldershot map were due, partly to a misapprehension of the true object and capacity of maps, and partly to want of experience in the use of maps on a comparatively small scale.

It may, however, be advisable in the first place to say a few words on the general object of maps, and the use which may be made of them for military purposes.

The best method of acquiring a thorough knowledge of the natural and artificial features of a country is by personal observation, but this requires time and opportunity, which are not always available. We must, therefore, have recourse to maps which enable us to form a correct judgment on the general character of a country, and to arrange and carry out personal *reconnaissances* in a systematic manner. It must always be remembered that even when the very best maps are available, personal observation is most desirable, if not absolutely necessary.

Maps are, however, of little value unless we are able to understand, or, more correctly, read them. Our eye should be accustomed to the representation of ground on the reduced scales used in maps, and to the special arrangements for showing elevation or relief; our eye should also be trained to appreciate the value and meaning of conventional signs, and we should learn to find our position readily on the map when using it in the field.

This power of reading maps can only be acquired by constant and careful study in the field. Perhaps the best method is to take a map and compare it with the ground which it represents, commencing with a large scale, then taking a smaller one, and proceeding from an open easy country to a hilly and close one. The student should open out the map in front of him and adjust it by compass bearings, or with reference to prominent objects, such as steeples and isolated houses, and should then identify the more marked features, including main roads, lines of railway, &c. He should afterwards carefully compare the features of the country with their representation on the map, and train himself to estimate distances, first on the ground, then on the map, using the scale as a check to his eye. He should also examine in detail the features of some well-defined position on the ground and on the map, and follow some of the roads, estimating as he proceeds the angles at which cross roads branch off. By this means the eye becomes accustomed to the conventional character which all maps must have, and learns to appreciate their true object and value.

In considering the practical advantages which may be derived from maps, we should always remember that they cannot be expected to give more information than their scale admits of, and we should in all cases ascertain the date of a map, and whether it has been revised since its publication, as this influences in a great degree the reliance that can be placed on it.

Good maps give distances correctly, and usually represent all

obstacles, as rivers, mountain ranges, &c., which might hinder the movement of an army; they thus enable us with great exactness to make dispositions for the march when at a distance from the enemy. When in contact with the enemy, the general direction only can be laid down in this manner; all details must be arranged on the spot. Maps should never be trusted when making arrangements for the movement of troops off roads, as there are so many obstacles, such as hedges, stone walls, &c., which frequently cannot be shown on account of the smallness of the scale. In selecting camping grounds, *reconnaissance* is absolutely necessary, but maps give much valuable information as to water, roads, proximity to villages, &c.

Maps are of great assistance in drawing up instructions for those *reconnaissances*, which form one of the most important duties in war, and for the work of an Intelligence Department they are invaluable; they are also extremely useful to the leaders of patrols, scouting parties, advanced guards, and flankers, and they facilitate immensely the difficult task of keeping up communication between detached parties and the main body, and between the columns of an army on the march. They are valuable, too, when making flank marches, surprises, and raids, and they furnish important data for the defence of rivers, defiles, and mountain ranges.

Maps on a large scale are of great use when the operations of a war assume a local character, especially in a mountain district; on outpost duty the lines of vedettes or sentries, with their supports, may be placed by them, and the patrols regulated. If sufficiently accurate, maps may be consulted with advantage when selecting a position for fighting a defensive action; they suggest the mode of strengthening the front, *points d'appui* for the flanks, communications in rear, &c., and they enable us to form general conclusions as to the employment of the three arms; it cannot, however, be too often repeated that a careful examination of the position on the ground is always necessary.

In fighting an offensive action, the general plan of the engagement, the direction of the advance, and the disposition for attack or retreat can alone be laid down with the aid of a map, always bearing in mind that it may be necessary to modify or completely change dispositions made in this manner. Details and the execution of the movements must be left to personal observation on the ground. The battle of Gravelotte is a good example of an offensive action, for which the dispositions were based on data derived from maps.

Such are some of the uses of maps in war, but they are also of value as a means of training in time of peace. I need not enlarge on their assistance in studying military history, merely remarking that it is desirable to have maps showing the state of the country, lines of communication, &c., as they existed at the date of the campaign. Maps may be used for obtaining a knowledge of the ground in the vicinity of garrison towns, for making arrangements for peace manœuvres, the training of troops in outpost duty and for service in the field, and for drawing up instructions for *reconnaissances*, such as those annually undertaken by Officers of the Staff College, and that made of Essex last year. Our larger scale maps might be employed far more than

they are for instructional purposes; for instance, the plans of the 25-inch map might be used for explaining the defence and attack of villages, the mode of placing the sentries, supports, patrols, &c. The 6-inch map might be used for taking up a defensive position; a special idea for the attack might be given, and the defender asked to describe in detail the means he would take to meet it, the employment of the three arms, the line of retreat if defeated, &c., the position of the troops being accurately laid down on the map.

One of the most important uses of maps in peace is, in a military point of view, for the arrangement of those skeleton manœuvres which were introduced with such success into the German service by Count von Moltke, and which have since been adopted by Austria and Russia. A most interesting account of the manœuvres carried out by the Russian Staff last year is given in the *Revue Militaire de l'Etranger*, a paper which I am glad to mention here, as it is one of the most remarkable offsprings of the recent war. In these manœuvres a general idea is given—say the advance of an army into Russia on a certain point. The Staff have then to draw out in detail the dispositions which would have to be made to meet it, first with a map, afterwards on the ground, when any modifications which a personal examination shows to be necessary are made. The Russian Staff have commenced at the Baltic, and they propose following the Russian boundary to the Black Sea, so that in time they will have well thought out schemes of defence for any invasion of the western frontier. I believe somewhat similar exercises have been introduced into the Staff College, but why should we not go a step further, and introduce them generally? The Generals commanding districts in England might possibly undertake similar manœuvres with the aid of their Staff; there could be no better instruction in Staff duties for the Officers employed, and in time a mass of information of the greatest value would be collected. Take, for example, the case of a supposed landing in Essex: the measures which should be taken for meeting the enemy, the selection of a position for an action, the means of transporting the troops, the selection of supply depôts, &c., are questions of great interest, which could be worked out with a map and by personal examination afterwards. If this were carried out systematically in all districts, a complete scheme of defence might be prepared for every eventuality that could be reasonably anticipated.

Before concluding this portion of the subject I would add a word of caution against placing too much reliance on maps. If they are looked upon as indispensable in time of peace, and their use permitted on all occasions, it may lead to the great detriment of the service in time of war.

A few words may also be said with regard to those military sketches, which are invaluable in war, and which should always accompany a reconnaissance report. It is to be feared that too much importance is attached to the scale of shade now in use; the scale is an extremely good one, but it should not be too rigidly adhered to, as it tends to develop monotony in style. It is quite right that there should be a scale, and that everyone should be taught on the same system; but it is too much to expect, as some do, that all Officers can be taught to

draw with such accuracy that anyone, by applying the scale, can tell the exact slope. There is quite as much artistic feeling in the proper rendering of a hill-sketch as there is in a landscape drawing, and this feeling should be encouraged. The great beauty of the sketches of the late Major Petley, our best Military draughtsman, is, that they possess in the highest degree, this artistic touch, though they may not be conventionally true. Rough sketches, such as those made by the German Officers during the late war, and described by General Walker in his lecture last year,* showing the positions of outposts, &c., are of great practical value to a large number of Officers, and they are within everyone's capacity. It is to be hoped that during the next manœuvres, the production of sketches of this nature will be amongst the means of training adopted, and that Officers may be instructed to lay down on the maps supplied to them the route of the regiment they belong to, its position in camp and in action.

It is extremely desirable that the non-commissioned Officers, especially those of cavalry regiments, should be instructed in the use of maps, and this can, perhaps, be best effected in the schools by means of the black board. The men might first of all be shown the manner of drawing the horizontal projection of a table with the articles upon it, and afterwards be told to draw it themselves, on different scales. They might also be taught the use of conventional signs and the mode of delineating ground in the same manner. A plan of ground near the station might be explained to them, and the method of placing outposts, &c., exemplified, and this instruction might be afterwards completed in the field.

Conventional Signs.—The use of conventional signs on maps enables us to give an amount of information which could not be otherwise shown; they should be simple in character, and not too numerous, otherwise the maps would become crowded with symbols, the meaning of which it would not be always easy to remember. There is a general similarity in the conventional signs of all countries; the foreign symbols are perhaps too complicated, whilst our own are hardly sufficiently numerous; for instance, no distinction is made between metalled and unmetalled roads on English maps. The conventional signs used on our military maps should, as far as possible, be the same as those of the Ordnance Survey; it is impossible now to alter the latter, and it would create great confusion, and be manifestly unwise to introduce a different system for military purposes. We should, therefore, confine ourselves to adding such symbols as are deficient in the Ordnance Survey system, or are necessary on a military map.

Photographic Processes.—The best maps of European countries are those produced by the Government surveys, and in the event of a campaign in Europe it would be of great importance to have the means of reproducing them rapidly and accurately for the use of the Army. For this purpose photography is invaluable, and various processes have been adopted in this country and abroad; it would be beyond the scope of the present paper to enter into minute detail, and it will perhaps suffice here to enumerate those now in use. In England maps are

* See Journal, vol. xv, page 823.—Ed.

copied by photozincography; in Belgium by photolithography; in Italy by Avet's process; and in Austria by Heliogravure. The maps of France used by the Germans were, I believe, reproduced by photozincography, photolithography, and the anastatic process; the latter, not a photographic process, is well known, and frequently used in England. The art of reproducing maps by photography seems capable of still further development, and the well known Heliotype process might probably be used with advantage in certain cases. A photographic outfit, with apparatus for reducing, copying, and enlarging maps, and laying them down on zinc, should form part of the equipment of every army in the field. The manner in which despatches were reduced and printed on collodion or gelatine during the siege of Paris is an example of the value of reduction; and as a specimen of enlargement, I may refer to that now on the table, which is reproduced from our one-inch map on the three-inch scale; this gives all that is required for taking up a defensive position, and would save much labour in sketching. A process recently invented by Lieutenant Abney, R.E., may be mentioned here, as likely to prove of great value in the field; by drawing a field sketch with a specially prepared ink or pencil, it is possible to lay it down at once on a zinc plate, and print as many copies as are necessary; a hundred copies of an order or despatch written with the ink might be printed in two hours.

Mounted Maps.—The best form of map for use in the field is that which is mounted on calico so as to fold in sections about 9 inches by 4½ inches in size. There is, however, one objection to this form, viz., the space between the several sections of the map. Attempts have been made to produce more serviceable maps by printing on calico, india-rubber, &c., but they have not as yet found much favour. The Belgian *Depôt de la Guerre* has issued some beautiful maps printed in colours on calico, and the Austrian War Department have made use of a new paper called *hanf papier* (hemp paper), which is light, tough, durable, and can be folded without mounting; but neither of these are so decidedly superior to the ordinary mounted map as to justify their sole use in its place.

Colouring.—Maps may be either printed in colours or coloured by hand. The use of chromolithography is attended by several difficulties, the principal one being that of expense. In a small country like Belgium it answers very well; but if our own Ordnance Survey maps were printed in colour, the expense, especially of revision, would be enormous, and there would be the additional difficulty of providing adequate storage room for the number of stones required. The colours used in chromolithography are generally too opaque, and obscure the detail, so that the map frequently loses more than it gains; it would therefore seem desirable for the present to restrict the use of chromolithography to special maps, such as those showing military districts, lines of telegraph, &c.

Some interesting and beautiful maps have been produced in Austria on General Hauslab's principle of printing strata of elevation between 1,000 and 12,000 feet in different colours or tints of the same colour, the lowest height being light, the highest dark.

The great secret in hand colouring is to keep down the general tints and give prominence to the most important features in a military map. These are the rivers, lakes, roads, railroads, telegraph lines, woods, and buildings. Anything which obscures the hachures is bad, and for this reason it seems undesirable, as a general rule, to colour arable and pasture lands.

Aldershot Map.—The objections to the map of Aldershot are chiefly four: viz., its small scale, its want of accuracy, its unsuitability for military purposes, and its defective colouring.

First, as regards scale: there seems, I think, to be some misconception as to the scale of maps required for service in the field. The maps that should be issued are—

1st. Maps on a scale of from 3 to 6 inches to a mile of the environs of fortresses for siege purposes.

2nd. Maps on a scale of from $\frac{3}{4}$ of a mile to $1\frac{1}{4}$ mile to an inch for the use of the Staff, for detached parties, and for *reconnaissance* work.

3rd. Maps on a scale of from 4 to 6 miles to an inch for general issue to Officers commanding regiments, batteries, &c.

4th. Maps on a scale of about 10 miles to an inch, showing the main lines of communication and the principal military features.

Large scale maps are all very well for purposes of instruction and study, for laying down the position of troops after an action has been fought, and sometimes for taking up a defensive position, but they are far too bulky for general use in the field. As an instance of this, we may take the case of the recent war, during which the German operations extended over more than 100 sheets of the map of France, on a scale of $\frac{1}{80000}$, about $1\frac{1}{4}$ mile to an inch, and there was at one time a probability of their extending over a much larger area. When we consider that the number of German troops actually under arms in France in the month of February, 1871, was 1,350,000, we see that it would have been almost impossible for any department to produce a sufficient number of copies of a map on this scale for general issue to the Officers, and the addition in weight and bulk to the baggage of the army would be greater than any General would allow. The supply of maps on the 1-inch scale must therefore always be limited; and in the present day, when battles are fought on such a large front, it would be very inconvenient for a General to have a map on a scale like that of 6 inches to a mile spread out in front of him.

It has been said that the 1-inch scale is too small to give the information required on active service, but this is, to say the least, doubtful. No one would think of using a map for tactical movements, and for all other purposes information which cannot be conveyed by a map on the 1-inch scale should be obtained by personal observation. It may also be noticed with reference to our own 1-inch map that, as it has been completed, and the other scales, 6-inch, and 25-inch, have made considerable progress, no Government will entertain the idea of publishing a military map of the country on a separate scale, whether it be 2, 3, or 4 inches to a mile, for each of which there are numerous advocates. The 1-inch map is that which would be placed in every one's hands in

the event of active operations in this country, and it is the one which should be carefully and attentively studied in time of peace.

2nd. *Want of Accuracy.*—There was a certain degree of justice in this complaint, as the map had only been partially revised since its first issue in 1815. The omissions were chiefly confined to some new roads, buildings, &c.; the hills, high roads, and main features remained unaltered, so that the map could be read with perfect ease, and any one who could not work with such a map in his hands would probably be equally at a loss with the best map in existence. Had there been an opportunity, the map would have been examined and corrected before issue, but the time between the selection of the Aldershot district and the commencement of the manœuvres was so short, and the demands for copies were so numerous and pressing, that it was only possible to take a direct transfer from the old map. The Officers of the field force appear to have taken it for granted that an Ordnance map, irrespective of its age, must be correct, and possibly for this reason it was not considered necessary to submit the map to that close personal examination which all maps require when operations are being carried on.

The great difficulties in the way of producing a revised edition of the old 1-inch map of England, and the serious nature of the whole question of revision, are not generally known. The changes in many parts of England have been so great that it would be necessary to re-survey them, and to make such large corrections on the copper plates, that it would be cheaper and easier to re-engrave the whole plate; it has therefore been deemed advisable to leave the 1-inch map as it is at present, merely inserting new lines of railway, and to publish an entirely new map* as the Cadastral, or 25-inch survey, progresses. This will cause some delay, but will in the end give us an almost perfect map.

It may be interesting to mention the system of revision in some foreign countries. In *Austria* maps are revised by the Survey Department, but a proposal has been made to employ the Staff Officers of the military districts on the necessary field work. To save making constant alterations on the copper plates, the corrections are printed on tracing paper, whence they can be easily transferred to the old maps. The map of *France* is periodically revised by Officers of the Staff, and in *Germany* the revision is also kept up by the general Staff. In *Russia* the maps are kept up to date by special detachments of the Topographical Corps, and two or three districts are revised annually. Would it not be possible in England for the Staff of each military district to keep the revision of so much of the 1-inch map as concerns them up to date? the labour of making the corrections would, after the first revision, be extremely slight, and if the map in the Headquarters' Office were examined on the ground once in every five years it would answer all purposes.

3rd. *Unsuitability for Military Purposes.*—There is truth in this objection also, as although the one-inch map was originally commenced as a military map, sufficient prominence has not been given to military features in its production, and, as stated above, the time

* Specimens of this map were shown at the meeting.

available was too short to allow any additions to be made to the map issued for the manœuvres.

The Ordnance maps having, for many years past, been constructed with the paramount view of their general utility to all classes in the kingdom, purely military symbols have been omitted to a large extent, so that they might not confuse or take the place of other valuable information of a general character.

The military character of our one-inch map has, in fact, had to give way to the civil requirements of the state, and it is this which makes it in some respects inferior to the maps of foreign countries, which are prepared with a view to their military rather than to their civil use.

The sheets recently published of Scotland and the north of England are a great improvement on the older ones, and the new one-inch map will be still better, though it will not give all we require in a military map. As we cannot expect to have a map of England especially prepared for the use of the Army, we should try and adapt the existing one to our purposes, by adding to it such information as may be necessary, and this might perhaps be effected, as well as the revision, by the Staff of each military district.

In revising and completing the one-inch map for military purposes the following points should be attended to:—

Terrain.—As far as the scale admits of it, everything should be shown on manœuvring ground that can retard or facilitate the movement of troops, and altitudes should be inserted on the crest of all hills, and in the beds of ravines and valleys.

Roads.—New roads should be inserted and classified in accordance with the conventional signs used on the Ordnance Survey, those which are metalled being distinguished by colour from those which are unmetalled. Cuttings, embankments, bridges, viaducts, &c., should be shown, as well as foot and bridle paths, when of military importance.

Railways.—All new lines should be inserted, and a distinction made between single and double lines of rail, and between horse and steam roads. Cuttings, embankments, bridges, viaducts, tunnels, &c., should be shown, and stations built of stone distinguished from those of wood by using the letters S and W.

Towns and Buildings.—New buildings of military importance should be inserted, the outline of towns, villages, &c., with their gardens accurately marked, and the most important streets well shown, even at the expense of side streets. Churches and other buildings of importance should be made distinct, and inns, posting houses, mills, &c., distinguished by conventional signs; on coloured plans a distinction should be made between stone and wooden buildings.

On active service the number of houses or population of each village should be inserted, as a fair estimate of its resources can be made from either.

Lines of Telegraph should be shown by a conventional sign or by a yellow line.

Woods and Cultivation.—The limits of woods, shrubberies, hop gardens, and other kinds of cultivation which might influence military operations, should be well defined. Swampy woods should be marked

as swamps, and a distinction should be made between woods of coniferous and those of foliferous trees.

Rivers, &c.—Streams which form a military obstacle should be distinguished from those which do not, by colour, or by representing the former by a double line, the latter by a single one. All hydrographical features, to the smallest swamp, should be shown, with the banks, when of military importance, and the means of crossing them. Iron, wood, and stone bridges, ferries, fords, dykes, water mills, wells, &c., should be distinguished by proper signs.

In rivers the limit of navigation should be marked, both for ships and for boats. It is also very desirable that the soundings should be inserted along the coast line from the Admiralty charts, as at present anyone taking up the question of coast-defence has to work with several maps on different scales.

4th. *Colouring.*—A limited number of coloured maps were issued for the manœuvres; they were originally prepared for the use of the Consultative Commission, and the defective colouring arose from an attempt to show too much on them. They were expected to give much information that would not be necessary on a military map; strong tints were used to bring out the several features, and the result was not at all satisfactory.

Special maps hardly come within the scope of the present paper, but specimens of road, railway, telegraph, and "Kriegsspiel" maps are on the table for the information of any one who wishes to examine them.

It now remains for me to review briefly the maps produced by the governments of European States.

Austria.—In Austria there is a cadastral survey on a scale of $\frac{1}{2880}$, or 22″ to a mile, the MS. plans of which are deposited in the office at Vienna. Copies are supplied to landed proprietors on payment. The published scales are—

$\frac{1}{14400}$ (4·4″ to a mile) for plans of battle fields, reconnaissances, &c.

$\frac{1}{28800}$ (2·2″ to a mile) for the vicinity of garrison towns, and other military purposes.

$\frac{1}{86400}$ (0·733″ to a mile) for the military map of Northern Italy.

$\frac{1}{144000}$ (0·44″ to a mile) for the military map of the Monarchy.

$\frac{1}{288000}$ (0·22″ to a mile), and the map generally known as Scheda's, on a scale of $\frac{1}{576000}$ (0·11″ to a mile).

The ground, which is occasionally treated a little too conventionally, is represented by vertical hachures on all the scales; the new map of Hungary, now in course of publication, is characteristically drawn and very well engraved. The survey is made with the plane table on a scale of $\frac{1}{2880}$. The want of a map on a scale between $\frac{1}{2880}$ and $\frac{1}{144000}$ has been felt so much since the war of 1866 that the Austrian War Department has decided on publishing a map of the whole monarchy on a scale of $\frac{1}{750000}$ (0·845″ to a mile), rather smaller than our one-inch map.

Road, railway, and other special maps, are prepared on various scales; many of them are printed in colour, and are very effective.

Belgium.—The cadastral survey is on a scale of $\frac{1}{2500}$ (25·344″ to a mile). The maps published by the Depôt de la Guerre are—

1. On a scale of $\frac{1}{20000}$ (3·168″ to a mile), printed in colours, the ground being shown by contours at one metre intervals. This map gives the most detailed delineation of ground of any map in Europe, but there is a want of uniformity in its execution. In printing the plans from six to seven stones have to be used, and this, of course, involves additional labour and expense, especially when corrections have to be made; as specimens of chromolithographic printing the plans are unsurpassed.

2. On a scale of $\frac{1}{10000}$ (1·584″ to a mile), engraved on stone; the ground is shown by contours at ten metre intervals.

3. Maps on various scales for special purposes.

The survey is made by Officers, principally from the infantry, with the plane table.

A good general map of the country, on which the ground is represented by vertical hachures, is published by Vandermäelen on a scale of $\frac{1}{80000}$ (0·792″ to a mile).

Contours are mathematically correct, and are of service in surveys on a large scale, but they do not give all that is required in a military map, and should be looked upon rather as auxiliary lines for the delineation of ground, than as furnishing such delineation themselves. They illustrate the distribution of high and low lands, but they are incapable of giving the minor modulations of the ground, and are less graphic than the topographical map, which is the only one that gives a good interpretation of the features of a country.

Contours at 100′ intervals often omit important changes of level, and cannot indicate the features of the ground, as a comparison of the two sheets of the one-inch map of Scotland now on the table, one with hill shading, the other with contours, will serve to show.

Denmark.—There is a cadastral survey on a scale of $\frac{1}{1000}$ (15·84″ to a mile), but the plans are not published.

The maps issued are—

1. On a scale of $\frac{1}{20000}$ (3·168″ to a mile). The ground shown by contours at 5′ intervals.

2. On a scale of $\frac{1}{80000}$ (0·792″ to a mile), with contours at 10′ intervals.

3. „ $\frac{1}{160000}$ (0·396″ to a mile) „ 30′ „

The survey is one of the most exact and trustworthy in Europe, and the maps are well executed, but the 10′ contours on the $\frac{1}{80000}$ map are not capable of rendering the features of the ground truly, and it is difficult to unravel the multitude of minute lines; the same may also be said of the $\frac{1}{160000}$ map. As the Danish islands have but small elevation, hachures would have given a better representation of the ground.

France.—The cadastral survey is on a scale of $\frac{1}{2500}$ (25·344″ to a mile), and the plans are kept in MS.

The government maps are—

1. On a scale of $\frac{1}{80000}$ (0·792″ to a mile). The map is prepared in MS. on a scale of $\frac{1}{40000}$ (1·584″ to a mile). The difference of level is shown by numbers, and the features by vertical hachures.

2. On a scale of $\frac{1}{320000}$ (0·198″ to a mile). The ground shown by vertical hachures.

3. Maps on various scales for battle-fields, &c.

4. Map of Central Europe on the $\frac{1}{320000}$ scale, printed in colours. Though said to be kept to date by the French staff, it is often inaccurate.

The execution of the sheets of the map of France varies; some of those recently issued are treated in an extremely artistic manner, but others leave much to be desired. The slow progress made in issuing the sheets is perhaps due to the difficulty of engraving the Alps, so as to give their proper character and relief.

Germany.—Prussia has a cadastral survey on a scale of $\frac{1}{2000}$ (31·680″ to a mile), of which only certain plans are published. In the Eastern Provinces the military survey is made on a scale of $\frac{1}{25000}$ (2·534″ to a mile), and published on the $\frac{1}{50000}$ (1·268″ to a mile), and $\frac{1}{100000}$ (0·634″ to a mile). In the Western Provinces it is made on a scale of $\frac{1}{20000}$ (3·160″ to a mile), and published on a scale of $\frac{1}{80000}$ (0·792″ to a mile).

The ground is represented by vertical hachures, and on the $\frac{1}{50000}$ scale, contours at 25′ intervals are printed in red over the hachures. The maps are clear and well executed, and due prominence is given to military features of importance.

An excellent map, on which the hills are well rendered and artistically treated, is issued by the Bavarian Staff, on a scale of $\frac{1}{25000}$ (0·253″ to a mile).

Several excellent maps of Central Europe are published by private firms in Germany; of these, Stieler's ($\frac{1}{740000}$), Reymann's ($\frac{1}{200000}$), Kiepert's ($\frac{1}{1000000}$), and Liebenow's ($\frac{1}{225000}$), were well known in England during the war of 1870–71.

Great Britain.—The maps prepared by the Ordnance Survey are:—

1. The cadastral, or parish survey, on a scale of $\frac{1}{2500}$ (25·34″ to a mile).

2. County survey, on a scale of $\frac{1}{10560}$ (six inches to a mile).

3. General map, on a scale of $\frac{1}{63360}$ (one inch to a mile).

4. Town maps, on various scales.

5. Special maps, on various scales, for War Department purposes.

The ground is represented on the one-inch map by vertical hachures, and on the six-inch map by contours at 5, 10, 25, 50, or 100 feet intervals, as circumstances may demand. Where the intervals between the contours are more than 25 feet, many of the minor modulations of the ground are lost, and the 6-inch map would be more useful for general military purposes if the hill features were shown by hachures, as in the specimen of the Surrey Hill map now before you.

The British survey is the most mathematically accurate in Europe, and as specimens of engraving, the sheets of the 1-inch map are unrivalled.

Holland.—The topographical map of Holland is made on a scale of $\frac{1}{25000}$ (2·534″ to a mile), and published on a scale of $\frac{1}{50000}$ (1·267″ to a mile). The survey is carefully made, but the execution of the sheets leaves much to be desired. The Dutch Topographical Department has

issued some beautiful specimens of chromolithography, of which the map of Java, and special Waterstaats maps, printed by Colonel Bessier's process, are particularly worthy of notice.

Italy.—In Northern Italy, the Austrian map, on a scale of $\frac{1}{86400}$ (0·733″ to a mile), is generally used; and Sardinia has a map on a scale of $\frac{1}{50000}$ (1·267″ to a mile), with the ground shown by vertical hachures. A new survey of Sicily, on a scale of $\frac{1}{25000}$ (2·534″ to a mile) has been completed, and that of Southern Italy is now in progress. The sheets are published as photographs on a scale of $\frac{1}{50000}$, and on a scale of $\frac{1}{100000}$ (0·634″ to a mile), by Colonel Avet's system of photogravure; this process is the best of its kind in Europe, and the maps are masterpieces of applied photography. On the manuscript maps the ground is shown by 10′ contours, and the state of the cultivation by letters, which offer no compensation for the usual conventional signs, and cause a want of life and warmth in the map, which detracts from its general effect. The sheets on the $\frac{1}{100000}$ scale have been reduced directly from the originals, instead of from a special map, on which the "details" had been recast for reduction, and the result is that it cannot be read without a glass.

Russia.—There is a cadastral survey of certain districts on a scale of $\frac{1}{8400}$ (7·543″ to a mile), but the plans are not published. The maps issued are—

1. District maps on a scale of $\frac{1}{84000}$ (0·754″ to a mile).
2. Military topographical map of the Empire on a scale of $\frac{1}{126000}$ (0·508″ to a mile).
3. A general map of the Empire, on a scale of $\frac{1}{420000}$ (0·151″ to a mile), printed in colours.

The features are shown on all the maps by vertical hachures, and the ground is well rendered on the small scale, but the drawing on the larger scales is not so satisfactory.

The use of the Russian language on the maps is inconvenient, but, thanks to the international language of symbols, they can be read with little trouble.

Sweden and Norway.—Maps of certain districts are published on a scale of $\frac{1}{20000}$ (3·168″ to a mile; the general maps of the country are on a scale of $\frac{1}{100000}$ (0·634″ to a mile), and $\frac{1}{200000}$ (0·317″ to a mile). The maps are printed in colours, and are clearly and characteristically executed; but the combination of vertical and horizontal hachures for the purpose of delineating mountains over 5,000 feet in a different style, is not very happy.

The new map of Norway, on the $\frac{1}{100000}$ scale, is very good; it is printed in colour, a style peculiarly suitable to the features of the country; the uncultivated tracts are tinted according to their steepness, whilst the gentler slopes are shaded on Lehman's system. It is also proposed to insert equidistant contours.

Switzerland.—The maps published are—

1. On a scale of $\frac{1}{25000}$ (2·534″ to a mile), printed in colours; the ground is represented by contours at 10 metre intervals.
2. On a scale of $\frac{1}{50000}$ (1·267″ to a mile), printed in colours, with contours at 30 metre intervals.

3. On a scale of $\frac{1}{100000}$ (0·634″ to a mile), with the ground shown by vertical hachures.

The maps are clear and well executed; that on the $\frac{1}{100000}$ scale is extremely beautiful, and as a specimen of cartography is probably the best in Europe. There is perhaps a little too much detail, and in places the names are sometimes obscured by the hachures.

Conclusion.—In conclusion, I must apologise for having introduced to your notice a rather dry subject, and for not having been able, from press of other work, to devote to it as much time as I could have wished. I have endeavoured as far as possible to avoid the more technical part of the subject, and must excuse myself for trespassing on your time by the importance I feel maps play in war, the wish that all Officers should be familiar with them, and that they should be used as extensively as possible.

With a good map, a watch, a telescope, and a few tried men, an Officer may start full of confidence on the most difficult mission that he may be ordered upon, feeling that an intelligent performance of the duty may prove the salvation of the Army, and decide the result of the war.

The CHAIRMAN: Gentlemen, this Lecture is to be followed by a discussion, therefore, if any gentleman has any observations to make we shall be happy to hear him.

Colonel ALCOCK: The Lecturer has expressed a fear that the Lecture which we have just heard has not been very interesting; but it is really of the greatest interest; and I believe that all present, and particularly the Members of this Institution, will desire to offer their thanks for so much useful information, and for the very agreeable manner in which that information has been conveyed. A proof that such information is interesting to the Members is, that we have a topographical department in the Institution, which contains both the newest maps and some more ancient ones, which served for the study of war of the last century. I may likewise mention, as connected with this subject, that we have made it a practice to mark the positions of the great events of the moment on our maps, because it has been found that in the progress of a war many places which become of great strategical importance are of very little importance upon the map, and, therefore, are difficult to find on some maps; while upon others, from the similarity of names, they may be found in two different places, or, in some cases, they may not exist at all. This unavoidably gives rise to uncertainty and trouble, and it was, therefore, thought desirable that in our topographical department, we should, by making the necessary references, do, carefully, for all, what each individual Member would otherwise have had to have done for himself, perhaps imperfectly, and sometimes with considerable loss of time. Although it may not be thought to apply to the subject immediately before us, yet I may be allowed to mention a recent instance in which the utility of this practice was shown during the late Franco-Prussian war: every movement of the troops was marked with such peculiar accuracy, that when the map was seen by the person practically the best able to judge, the gallant Crown Prince of Germany, when he did us the honour of visiting the Institution, I am informed that he expressed his surprise; and when it was suggested to him that there was a mistake at a particular place, he said "far from it; there is no mistake, the advanced guard was one march in advance at the time when there was an alteration in the line of march." He was gracious enough to pay us some high compliments upon the accuracy with which positions were marked upon our map; and these compliments were, I believe, not undeserved. That map is a remarkable record of the industry of Mr. Sullivan, to whom we are indebted for his attention to it. We have to regret that it cannot be photographed, and it must, therefore, be ultimately lost. In proposing a vote of thanks to Captain Wilson, I

hope I may be pardoned for having intruded upon your time by mentioning the circumstances which have rendered his lecture peculiarly interesting to us.

Lieutenant-Colonel MIDDLETON, Superintending Officer of Garrison Instruction: Mr. President, as the Lecturer spoke about maps for autumn manœuvres, I should like to ask him one question, which I am the more emboldened to ask by his having stated that he thinks there is a fear of too much stress being laid upon the new system of scale of shade. I wish to ask him whether he thinks the scale of shade system is adapted for the maps of the ground on which autumn manœuvres take place. My reason for asking this is, that there was a map supplied to the Generals and Staff at the late Volunteer Review at Brighton on the scale of shade, and very few Officers could understand a bit of it, simply because the scale of shade was a new thing, and the elder Officers who were able to read maps in the old style were unable to read these, and they were, therefore, perfectly useless. One of the difficulties of the scale of shade, except to any person really cognisant with it, is to distinguish the top of a hill from the bottom. I have been accustomed to this system myself, but I had some difficulty the other day in deciding at once on one of those very Brighton maps, when I was asked which was the top and which the bottom of a hill; and though I do not set myself up as an authority, my doubts were shared by one who is no less a person than the Director-General of Military Education, who himself had to look twice before he was quite certain at a moment's notice as to whether it was a plateau or a valley. I should, therefore, like the lecturer to say whether he really thinks the new scale of shade is adapted for this purpose. With regard to Non-commissioned Officers, I believe the Director-General will tell you that steps have been taken to supply the instruction alluded to by the lecturer. As to the suggestion of correcting maps, which I think a very good one, I would beg to point out that the Staff of a Division in peace time is generally fully occupied without going over the country correcting maps, and I think there will be found the same with regard to Engineer Officers. But I fancy there can now be found at every station regimental Officers who are quite competent to correct maps if they have them supplied to them, and are sent out and regularly told off to certain districts under the supervision of the Garrison Instructor. The only difficulty that would arise is the old one, that generally stands in the way of everything—which I am afraid is an important one in this case, viz., that of money. These Officers might not have horses of their own, and there comes the question as to whether they could be furnished with Government ones for the time, or be granted an allowance. If either plan was adopted, I think there would be very little difficulty in the matter.

General Sir WILLIAM CODRINGTON: I think the general fault of English maps, as compared with foreign maps is, that they are too dark. There is a great deal of black printing which makes the English military map unfit for military purposes, compared with foreign maps. Take the maps of Switzerland. I daresay there are many present who have walked through Switzerland with Keller's map. It is a very mountainous country, and yet any person who has been there with a knapsack, knows where to find the top of a hill and the valley, the village, the bridge, the pass, and footpath all marked on the map. Yet it is a very simple and light-coloured map; there is no confusion about it. What we generally put into our English maps is too heavily engraved, and this makes them too dark and confused. One of the marked characteristics of *Scheeling's* map of Germany, is its clearness and lightness of engraving. It is quite sufficient to mark the hills, their height and steepness must be comparative in the man's mind who is looking at them. You cannot have them all excessively dark. As long as the hill is actually marked, and you can know the top of a hill from the valley, you don't want to have it very black. That is really the fault of all English maps. I see also in the new specimens of the one-inch Ordnance Map, the hills seem to be marked in rather too dark. I hope this is not a necessary part of that engraving, because when all the villages, the names, roads, &c., are put in, the dark printing makes confusion; but the one-inch map seems to be by far on the best scale. It is perfectly clear for almost anything an Officer wants, and certainly gives all the features that are wanting in a military point of view.

Sir HARRY VERNEY, Bart.: It has occurred to me that one defect in the Ordnance maps is the want of any means of finding out from them the inclination of hills,

whether one hill commands another; and this appears to me to be rather a serious evil. Whether it has been corrected in the new Cadastral map I have not had the opportunity of seeing. The contour maps supply the want, by being marked with lines of identical elevation, the lines being at a certain fixed height above each other, say 10 to 20 feet, with thicker lines or red lines at a certain given height, say 100 to 200 feet. Another objection is, that the shading of maps is not uniform, some are much darker than others. So that when you put different squares together, you cannot tell the comparative height of hills, unless the shading of all the squares is equal; you cannot be sure that the proportion is kept between one deviation and another. The lecturer said that Officers engaged on coast defence are unable to learn from the Ordnance maps what is the depth of water near the shore; but I believe that it is universally laid down on the Admiralty charts. There may be a sufficient reason for that—the Ordnance maps may be bought by our enemies. Whether the Admiralty charts are published I know not.

Sir WILLIAM CODRINGTON: I believe the Admiralty charts are published and sold to any person who chooses to buy them.

Admiral Sir FREDERICK NICOLSON, Bart.: I should like to confirm Sir William Codrington's remarks about the Swiss maps. I was, when a boy, at a school in Switzerland, and I have in my possession a map which I had then, and with which I have walked through Switzerland on many occasions. It is admirably clear. I wish to ask the lecturer whether in any maps there is a sign or figure to show the depths of rivers. For instance, if an Officer knowing the country well should happen to come upon the Thames in any part of its course, could he tell at once the average depth. I am not referring merely to fords, because I daresay they would be marked, but to other parts of the river. It would be useful in many military operations to know how far up a river a vessel of a certain size and carrying a certain weight of cargo, could go.

Major-General BEAUCHAMP WALKER: The observation I am going to make may perhaps rather surprise you as coming from myself, but what has fallen from the lecturer to day, from Sir William Codrington, and others, emboldens me to make the assertion that we all expect too much from maps in England. Because maps were found very useful, we fancy that maps can supply every want in war. I doubt very much whether maps, excepting to the general staff, as Captain Wilson says, for the purpose of taking up ground in the investment of fortresses, in preparing defensive positions, in perhaps throwing out the idea of great general concentrations which must take place on a particular point, are of much use for *tactical* purposes. Tactical movements are so quick, and a man has so much to think of at the time he is engaged in directing them, that he must be a very apt reader of a map who can form any clearer idea from that map than he will from the appearance of the ground before him. But the study of maps will enable a quick and clever man almost invariably, particularly if he has any knowledge of geology, to tell what style of country lies before him after he has got beyond the range of his own vision. There is where I think study of maps is so very useful in increasing the intelligence of Officers in the field; but that they can actually use them for the tactical movements of the day, I very much doubt.

Sir WILLIAM CODRINGTON: There is one point which I might perhaps refer to, viz., "the contour lines." The contour lines seem to me, looking at maps merely as showing the country, as infinitely less clear in giving the ground than the old line military drawings. I don't know whether it is established as a rule that contours are to be used in the new maps, but certainly as far as those are concerned who do not want to know accurately the exact elevation, but who do want to know the general features of the ground and the comparative elevation, I think the common usual line-drawing of hills is more clear than contour lines.

Captain WILSON: There are a few remarks which I should like to make on the scale of shade as applied to the Brighton map. I did not intend opening any discussion on the scale of shade, as that question was settled long ago; my intention was to confine myself to the maps issued by the Governments of our own and foreign countries. Perhaps one reason for the indistinctness of the Brighton map is the haste with which it was prepared. It may be remembered that there was some

difficulty in making arrangements for the review, and in consequence of this, the field sketch, which was at one time stopped, only came into the lithographers' hands a few days before it was necessary to issue copies. The result was, that the lithographer was pressed for time, and though the drawing is accurate and in accordance with the scale of shade, the sketch is wanting in character. The scale of shade introduced for the six-inch scale is not, I think, applicable to smaller scales, such as the three-inch. With reference to the correction of maps by Officers, I am sure every one would be grateful to any Officers who would undertake the work; I mentioned the District Staff, as I presumed the General commanding and his Staff would be most interested in obtaining a correct map of the district in which they are serving.

With regard to Sir William Codrington's observations on the manner in which the hill features are represented on the one-inch map of England, I may remark that as all the sheets could not be drawn by the same person or engraved by the same hand, there must necessarily be some difference in style. Several of the sheets were drawn before the close of the last century, and it is a most curious study to examine the sheets from south to north, and trace the progress that has been made during the last 70 years in hill sketching and engraving. Though the styles differ, the drawing of the southern or older sheets is extremely good, and the hill features are well rendered. The blackness complained of is due to the system adopted by the Ordnance Survey of introducing light from the north-east corner of the sheet to produce artistic effect; this throws one side of the hills into shade, and tends to obscure the detail. I think myself it would be more satisfactory to adopt a scale of shade or uniform system of shading, and not to introduce light and shade. Sir Harry Verney remarked on the absence of heights on the old map; this has been rectified on the sheets recently issued, which give more altitudes than any other map in Europe. The question of contours *versus* hachures I leave to the specimens of the map of Scotland now before you; I may, however, mention that on the new one-inch map it is proposed to print the hill features over the contours, and that the latter can be easily strengthened by hand should it be considered desirable. Sir F. Nicolson asked whether there was a conventional sign for showing the average depths of rivers. I do not know of one for this purpose; if the depth of a river were known and it was required on a map, it would be given by a figure. There are conventional signs in all countries for showing when streams or rivers are military obstacles, when they are fordable, and the limit of navigation distinguishing between ships and boats.

The CHAIRMAN: From the number of Officers who have taken part in the discussion, I think Captain Wilson need not have been afraid that his lecture would be uninteresting. On the contrary, it is a subject not only interesting, but also very important to all Officers in the present day. Therefore, I have great pleasure in returning thanks, on behalf of the meeting, to Captain Wilson for the lecture with which he has favoured us.

Evening Meeting.

Monday, May 6th, 1872.

Captain Jasper H. SELWYN, R.N., in the Chair.

NAMES of MEMBERS who joined the Institution between the 30th April and 6th May, 1872.

ANNUAL.

Batten, John M., Capt., 8th or King's Regt.
Erskine, George, Colonel, late Mil. Train.
Lewis, J. F., Lieut., R.E.
Yates, H. Peel, Colonel, R.A.
Balfour, Geo. M., Captain, R.N.
Farr, William, Lieut., R.N.

"THE RULE OF THE ROAD AT SEA, OR THE STEERING AND SAILING RULES."

By W. Stirling Lacon, Esq.

Mr. Chairman and Gentlemen,—During the last eighteen years that I have had the honour of taking an active part in the affairs of this Institution, I have always impressed upon every person desirous of bringing anything before the public in this theatre, the necessity of putting what he is going to say into writing, in order that he may condense his matter into the very smallest compass. But although I have given that advice to others, I find it is impossible for me to do the same myself, not so much because it is a technical subject, as that I am obliged to make use of little models, and therefore I could not work them and read any notes or written lecture at the same time. I am, therefore, going to trust entirely to experiment, that is, to trust throughout to my own memory; and if I should at any time fail, or break down, if you would kindly wait, and give me encouragement —having truth as my guide—I have no doubt whatever that I shall arrive at a satisfactory issue. It has been the custom also in this Institution for a lecturer to deliver his lecture first of all, and then for persons to put any questions to him during the discussion. Perhaps during the time that my models are on the table, it would be more advantageous if gentlemen would put any questions to me where I do not sufficiently explain myself. It would save time, because, probably, if we were to leave it to the end of the lecture, we would not be able to recur to the same position.

Gentlemen, I desire to point out to you that this subject was brought

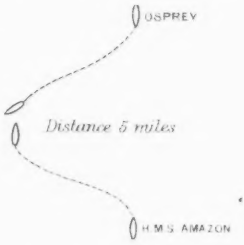
Diagram N° 1.

Diagram left at the Admiralty

Diagram N° 2.

Course coming over from Antwerp

Diagram N° 3.



Both sunk. 11 lives lost

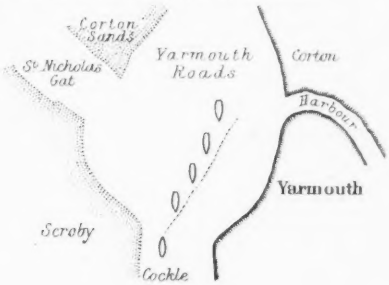
Diagram N° 4.

Bhima sunk. 79 lives lost

Diagram N° 5.

Diagram N° 6.

23 large Steamers which had been lying at anchor followed each other in succession



J. Jobbins

before this Institution six years ago. Two gentlemen, Captains Heathcote and Curme, came here and read papers on the questions of "Collisions at Sea," and "the Rule of the Road at Sea." The Institution devoted a number of its Journal to those subjects, and also to the question of the "loss of life at sea;" Mr. Holland, the member for Evesham (who is now out of Parliament), has brought it six times before the House of Commons; and Sir John Hay, the Chairman of the Council, is about to bring it to-morrow night for the third time, before Parliament. It may be asked, what have I to do with it? As a boy I was a sailor, and for 40 years I had not been at sea, and I had really forgotten all about these matters; but when this question was raised in this Institution, I will read to you what took place—I quote from the Journal of the Institution:—"It was after the discussion upon "Captain Curme's paper, on Monday evening last, that I went home "and pondered deeply upon what I had heard, and it was that night "from 12 to 3 a.m. that I lay awake during the very time that the "'Osprey' and 'Amazon' were sinking, and the next morning I "carried to the Admiralty a diagram, of which Diagram No. 1 is "a copy. I said then (24 hours before we received intelligence of "the collision) that vessels meeting in that position would in all "probability come to grief. This diagram, illustrating what actually "took place in the case of the 'Amazon' and 'Osprey,' was exhibited "to members in the library of the House of Commons during that "session of Parliament (1867)."

Many other circumstances have occurred, and have so acted upon my mind, that I have felt that I was called upon to press this subject upon public attention, and that it was a sort of mission which was given to me to carry forward. Shortly after this, I wrote the following letter to the Admiralty:—"Most earnestly would I press upon their "Lordships' consideration the following cases of collision, the consequence of the existing law and that which preceded it:—

"The 'Erin' and the 'Pasha,' in the Straits of Malacca.

"The 'Black Prince' and the 'Araxes,' off the Coast of Spain.

"Her Majesty's ship 'Amazon,' and the 'Osprey,' off the Lizard.

"The 'Mary Nixon' and schooner (name unknown), in the Channel.

"The 'Bruiser' and the 'Haswell,' off Aldborough.

"The 'Cobden' and the 'East Cornwall,' off Orfordness.

"The 'Bhima' and the 'Nada,' in the Red Sea.

"The 'Agra' and the 'Elizabeth Jenkins,' off the Ower's Light, "&c., &c."

After this I wrote a whole volume upon the subject in the public journals, and then I thought that I had done enough, and that I required a little recreation, and that the British public required a little recreation also. I decided, therefore, that I would go abroad, and I went to Norway. Now I ask you to follow me, because this is an international question, and the lives of foreigners are dependent upon it as well as those of our own people. After driving a thousand miles and parting with my friends, on my return to Christiania I found myself alone in a foreign country without language and without introduction.

But that very night I met the English Consul and the Norwegian Admiral. I spoke to the latter, and he asked me to come to the Admiralty to him the next day. I went, and I explained "the rule of the road" to him for an hour and a-half. He seemed very much impressed with what I said. He told me that Sweden and Norway were under the same Crown, and that they had independent legislatures, but that they acted in unison. He said, "Are you going to Stockholm? if so, I will give you letters of introduction." He did, and presently I came to Stockholm. At Stockholm they were prepared to receive me, and at the Admiralty at Stockholm six Officers were appointed to meet me. We went into this subject for two hours and forty minutes. I explained to them, as I explained to other Admiralties when I came to them, that I was a private individual without any authority whatever; merely desirous of eliciting truth, and that I was not in a position in any way to ask their opinion or to compromise them with their own Governments. When I got back to London, I received a letter from the Admiralty at Stockholm, saying that Sweden must follow England in "the rule of the road at sea," and thanking me for my noble efforts. That was very strong language to make use of to a total stranger, who had never seen these men but once. They called upon me the next morning at my hotel with a Danish Officer, and with letters of introduction to Copenhagen. In the course of time I came to Copenhagen, and there eight Officers were appointed to meet me. They sat round a table all in uniform, and the same thing took place as at Stockholm.

I then came to Hamburgh, and I wish to direct your attention to what took place. I asked the landlord of my hotel if he could bring me into contact with any gentleman who could forward the object I had in view. It so happened that he sent me to a gentleman who turned out to be one of the Senators of Hamburgh. By his instrumentality we got together the same evening eight competent men, masters of ships, and others, who met at seven o'clock. I went into the question the same as at Copenhagen and Stockholm for about two hours and a-half, and nothing could exceed the enthusiasm of these gentlemen. After our discussion was over, they told me a reporter was present, and that what had taken place should be reported in the newspapers, and that a copy with a translation should be sent to me in London. On my arrival in London in about ten days, it was quite evident that the Hamburghers had in the meantime communicated with England, for instead of receiving what I expected, I received a letter signed by all the gentlemen who were at the meeting, repudiating everything, and charging me with having come among them, and knowingly told them deliberate falsehoods. Few Englishmen would quietly have put up with this, and would have answered them probably in not very courteous language, but I was carrying forward a great question, and I am proud to read to you my reply, which is published by Parliament, for gentlemen, I did not allow my temper to interfere in any way with the object I had in view. "I received the letter which has been addressed to me from Hamburgh. But previous to this I had made a report of what had taken place

in the various cities on the Continent. But I will take care that a copy of your letter shall be appended to the report, and that a copy shall also be forwarded to the various cities named. It is a question of human life, and I have no interest whatever in the matter; but Hamburgh may rest assured that into whatever hands this question may fall, and by whomsoever it may be dealt with, it will be in a spirit of gentlemanly feeling, generosity, and forbearance, antagonistic to the letter which has been addressed to me from Hamburgh." Gentlemen, has there been anything underhand here? It is not for me to say that. But shortly after this, the correspondence of the Board of Trade with Hamburgh was moved for in the House of Commons, and something else was laid upon the table. I repeat it. The correspondence of our Board of Trade with Hamburgh was moved for in the House of Commons, it was ordered, and something else was laid upon the table.

After this I came to the Hague, and got an introduction to the Member for the Hague, who, it turned out, had commanded a frigate in Japan. I was with him an hour, and he gave me a letter to the Admiralty at the Hague, telling me, "When you get back to London, "send me all the particulars, and I myself will bring the question before "the States General." I then came to Brussels, still with no introduction, but with truth as my guide. I called at the Foreign Office (at Brussels they have no Admiralty) and stated my case in a very few words. They said, "Will you call again to-morrow morning." I called the next morning and was told, "I am desired by the Minister "to inform you that he will immediately telegraph down to Ostend to "assemble all the Captains in the port, and when you get to your "hotel a letter shall be sent to you, accrediting you to go down on the "part of the Government." In consequence of this I went down to Ostend. At an assemblage of all the Captains in the port we went into this case thoroughly, and at the end of our discussion, the Captain-Superintendent rose, and, addressing me said, "Sir, we are unanimously in favour of your propositions, and we think that they ought "to be immediately translated into every foreign language." I went on to Paris and presented myself at the *Ministère de la Marine*. But France was, with England, the author of the existing rules; and, finding that there was reluctance to entertain the question, to use the words of Tennyson in his Northern Farmer, "I just coom'd away." I have received a communication from Washington to say "You have sent "quite enough to Washington to enable the people here to judge of "the merits of the case." And I have also received the thanks of the Minister of Marine at Rio, through their Minister in London.

Having said all this in order to show you the importance of this inquiry, I will now point out to you what was the position of this question when it was first brought under the notice of this Institution. This is a pamphlet "On the Rule of the Road for Steamers," which was issued at that time by the Association for the Protection of Commercial Interests as respects wrecked and damaged property (Lloyd's). There are three diagrams, and explanatory letter press, with A, B, C, and D, with one dot, two dots, and three dots. I will leave it

upon the table for the inspection of any gentleman; but I question whether any senior wrangler at Cambridge could understand it.

Much about the same time there was issued from the Board of Trade, a paper containing a compass within a compass, and 480 questions. The Board of Trade have also issued 10,000 copies of "nursery rhymes," and a catechism. It is a new style of legislation in this country; and when I come to the end of my lecture I shall tell you what those "nursery rhymes" are. Now, how stands this question as regards Parliament? Parliament left it in this way ten years ago, that Her Majesty might on the joint recommendation of the Admiralty and the Board of Trade, alter and amend these laws. You will lay particular stress upon the word "joint," because anything that one does without the other is perfectly illegal. On the 22nd of February, 1867, the Admiralty wrote the following letter to the Board of Trade:—"My Lords Commissioners "of the Admiralty having received numerous letters on the subject of "the rules and regulations respecting lights to prevent collisions at "sea, I am commanded by their Lordships to acquaint you, that they "would propose, should the Lords of the Privy Council for Trade "concur, to appoint a naval Officer, and to request an elder brother of "the Trinity House to meet with him, and consider what mode, if "any, can be adopted to lessen the danger of collisions, and whether "any change is expedient; and my Lords would be glad if a gentle-"man from the Board of Trade could join in the consideration of the "subject." On the 14th of June the Admiralty again wrote to the Board of Trade:—"Having laid before my Lords Commissioners of "the Admiralty your letter of the 3rd instant on the subject of the "International Steering and Sailing Rules, I am commanded by their "Lordships to acquaint you, for the information of the Lords of the "Committee of Privy Council for Trade, that my Lords were, and are "still prepared to appoint an Officer to aid in the consideration of the "subject, but that as the Lords of the Committee of Privy Council "have expressed such strong objections to re-open the case, my Lords "do not intend to take any further steps in the matter."

The Admiralty having retired from the case altogether, and the co-operation which ought to exist between the two departments having ceased, surely the time had arrived for the interference of Parliament. Mr. Holland has six times brought the question before the House of Commons, and Sir John Hay twice.

Mr. Holland, writing to the President of the Board of Trade, March 2nd, 1869, says:—

"I must be allowed an expression of regret at your refusal to take "into consideration 'the rule of the road at sea,' as brought last week "before the House of Commons by Sir John Hay. Your reply to that "gallant gentleman cannot be looked upon as satisfactory by any one "who has investigated the present working of the rules. Although, "like yourself, no sailor, I have been so struck with the frequency of "collisions at sea, that I determined upon ascertaining what there was "in the regulations admitting of their constant occurrence, and I found "that the rules which were enacted in 1862 are framed contrary to the "custom of the sea, and the practice of seamen; not with regard to

" steam-ships only, but the rule for sailing-ships, which had obtained " for centuries, was altered at the same date. Now had Sir John " Hay's request of an enquiry into the causes of collisions been ac- " ceded to, this would have been made evident.

" For the last two years and a-half I have paid much attention to " the subject of collisions at sea, and I have six times in the House of " Commons either moved for papers, or asked questions of Government " connected with these Rules of the Road, but on each occasion of my " doing so I have received either an evasive reply, or have had a " promise—which has never been fulfilled—of the papers being forth- " coming after communications (which were pending) had taken place " with France and other Governments.

" I now beg to call attention to the fact that the Rules of the Road " at Sea, common to other nations with ourselves, have been altered, " and amended, without communication with those nations (the Order " in Council of August 4th, 1868, is an instance of this), and that, " therefore, the grounds on which you declined the consideration of " Sir John Hay's suggestions surely are not tenable.

" From the single wish to frame regulations such as may prevent the " loss of life at sea to the fatal extent which at present prevails, I pray " you, Sir, to give the question of 'the Rule of the Road at Sea' your " best consideration."

Mr. Holland, being out of Parliament, the President of the Board of Trade, in answer to Sir John Hay, says, February 26th, 1869 :—

" With respect to the question which has been put by the hon. and " gallant gentleman, the member for Stamford, the House will hardly " expect that I, who am not a sailor (a laugh), should enter into " minute and technical points to which he has drawn attention. The " rules now in force are, I may add, very simple. They are such that " any person may learn them, as a child does a nursery rhyme, in a " very short period, and it is impossible that a man sober, in his senses, " and not panic stricken by the events of the moment, should not be " able to remember and apply them. They are taught to all masters " and mates of ships, who cannot obtain their certificates until they " thoroughly understand them."

What, I would ask, becomes of the great bulk of the maritime population who are not taught these rules, nor the nursery rhymes, nor their catechism, and know nothing whatever about them?

Again, on April 25th, the President says :—

" From all the advice I am able to act upon, I think it would be " very disadvantageous to appoint a committee, and disturb in this " country, by inquiry, any question which all maritime countries at " least believe to be satisfactorily settled."

Yet, at this very time, the Board of Trade were in negotiation with the French Government, and the communications are very much in the style of the Association's pamphlet above mentioned.

On reading in the Parliamentary proceedings what has been addressed to the French Government, I feel positively ashamed for the honour of my own country. But I go further, and when I find this reply, " Cet article me paraît dangereux dans sa réponse; il y a là une

" appréciation qui va bien au delà du texte du réglement international," I say if a proposition has been made to any foreign Government which will bear such a construction, who made it?

Mr. BRASSEY, M.P.: May I ask what the proposition was?

Mr. LACON: I cannot tell; the above is the answer. But I will go further. It is impossible that an Order in Council can be issued without the concurrence of the Admiralty, because, if you recollect, I read to you that the *joint* concurrence of the Admiralty was necessary. But I am going to shew you presently that an Order in Council has been issued. How was it then issued without the concurrence of the Admiralty? I say that the concurrence of the Board was never obtained, that the question was never submitted to the Board.

We will now go back to the Privy Council, and I am going to show you what a dilemma we have been brought into. The Board of Trade applied to the Privy Council for an Order in Council, and the Privy Council write, 11th February, 1868,* " I have the honour to acquaint you, for " the information of the Board of Trade, that I have laid before the " Lord President of the Council and the Lords of the Judicial Com- " mittee your letter of the 21st of January, enclosing certain memo- " randa and diagrams, intended to explain to sea-faring men the rules " established by the Order in Council of the 9th of January, 1863, and " requesting to be informed whether their Lordships see any objection " to the official issue by the Admiralty and the Board of Trade of the " memoranda and diagrams in question, and I am directed by their " Lordships to give the following answer to this question:—

" It does not lie within the province of their Lordships to offer any " opinion on the merit of these memoranda and diagrams for nautical " purposes. They confine themselves therefore to the obvious remark, " that the promulgation by authority of these explanatory memoranda " and diagrams would naturally suggest the inference that the existing " rules, which have the force of law, are not sufficiently clear and ex- " plicit, and that the diagrams by which those rules are accompanied " do not accomplish their object.

" In other words, the existing rules are condemned by the course " proposed to be taken; and in the eyes of the class of persons whose " duty it is to apply the sailing regulations the interpretation would be " apt to supersede the enactment.

" The opinion which the Lords of the Judicial Committee have " formed on this subject is, however, mainly based on their Lordships' " experience as the High Court of Appeal for maritime causes; and it " is chiefly to the legal consequences of the proposed 'memoranda and " 'diagrams' that their Lordships have addressed their attention.

" The direct legal consequences would be a nullity, inasmuch as it is " admitted that these 'memoranda and diagrams' have no legal autho- " rity whatever; but the indirect consequences would, their Lordships " apprehend, prove exceedingly inconvenient. It is proposed to place " in the hands of sea-faring men two documents, the one purporting to " explain the other. If they are absolutely identical in form, it is

* See Parl. Pro., 1869, 115, No. 33.

" difficult to see what is gained by this addition. If they are found to " vary, however minutely in expression or purport, the commentary, " which is of no authority, would, in practice by seamen, supersede " the text, which is the law. It would be difficult to make a seaman " understand the principle of law by which he would be absolutely " precluded from pleading these 'memoranda and diagrams' in a " collision suit, whilst he would be held liable by the Court for the " slightest deviation from the rules themselves.

" Their Lordships must observe that it appears to them dangerous " in principle to attempt to give in an official paper that interpreta- " tion of the existing law which appertains to courts of justice only; " and no one can tell until a given case arises, and is argued, whether " there is perfect harmony between the letter of the rules and these " 'memoranda and diagrams,' or whether the latter may not contain " directions and explanations tending to mislead the seaman.

" Moreover, it must be remembered that the concurrence of all the " maritime Powers has been obtained to the existing rules, which have " become therefore at this time the general law of the sea. No such " concurrence has been obtained for these 'memoranda and diagrams.' " They may or may not be accepted and adopted by foreign nations. " But if Great Britain were to set the example of issuing an official " paper to explain and illustrate her own rules, there is no reason " that each of the maritime powers should not do the same thing " in other forms, and instead of the uniformity of regulation which " has been happily established, the question might relapse into con- " fusion.

" On these grounds the Lords of the Judicial Committee think that " the official publication of these documents is open to serious objec- " tions, more especially with a view to the application of that legal " liability which it is the duty of courts of justice to enforce in cases " of collision at sea.

" If the existing rules are imperfect they ought, in their Lordships' " judgment, to be rendered more complete by the addition of further " rules emanating from the same power as the rules themselves and " clothed with the authority of the law. But the interpretation of the " rules must, according to all sound legal principles, rest with courts " of justice alone, and cannot safely be assumed or anticipated by any " administrative department of Her Majesty's Government."

Notwithstanding this letter of the Privy Council, notwithstanding the action of the Admiralty, the Order in Council of August the 4th, 1868, was issued explaining the rules, and altering and overriding the interpretation of them, as laid down by the Admiralty Courts both in England and Ireland. This Order in Council has not received the concurrence of the Foreign Powers, parties to the rules of 1863; and on March 9th, 1869, the Board of Trade sent the following instructions to the Foreign Office:—" In short, it is for each country to act in " such a manner as her laws and method of procedure may require, " in order to promulgate and give effect to the explanation of the " rule."

The CHAIRMAN: Mr. Lacon, I must ask you to allow me to take the

sense of the meeting, because these statements involve the conduct of two departments of the State. Technicalities are what we discuss here.

Mr. LACON: I am coming to the technicalities, because I have nearly finished on this point. On the 22nd of December last the *Shipping Gazette* says, "That the learned Judge of the Admiralty Court has "adhered to the principles enunciated by Dr. Lushington, and has not "been guided by the Order in Council," and asks "Whether the Law "Officers of the Crown should not be instructed to give their opinion "as to the power of the Government to interpret a statute by such a "declaration as that of the Order in Council referred to."

Now, as the Chairman has suggested to me, we will go into the technicalities of the subject; and first of all I will ask you to dismiss from your minds entirely the question of steam, because a sailing vessel and a steam vessel are two wholly different things. We must first entertain the question of sailing ships, and ask what was the condition of things previous to those rules being issued.

For centuries there had been no written law. The custom and practice of the sea had obtained ever since we were a maritime country —and this custom and practice obtain to this moment, notwithstanding the existence of the rules; eight-tenths of the sea-faring population never having heard of the rules at all, and the remainder probably imperfectly understanding them. Now, what is Sir John Hay proposing? He says, If you must have a rule, make your rule and your custom the same; put your custom and practice into words. When I say that so large a proportion as eight-tenths of the sea-faring population never heard of these rules, is it to be wondered at, when the Navy know nothing about them? Let me quote from the letter of a gallant Admiral in the *Times* of November 27th, 1866. Since I have been connected with this subject, I have never taken any notice of an anonymous writer; but Admiral Ryder, like a British Admiral, always carries his flag at his mast head, and is never ashamed of what he is doing. He says: "I have good reason for believing that the altera- "tion which was made by an Order in Council in the sea rule of the "road in 1863 is not so generally understood by the young Officers of "the Royal Navy and the merchant service as it should be. It is "urgently necessary that the Officers of the watches—who in the "smaller men-of-war may be midshipmen, and sometimes warrant "Officers, should know the existing Rules of the Road by heart, so as "to be able to apply them on the shortest notice. I beg to suggest to "the Officers who have, or who are likely to have, the charge of the "watches at sea in any of Her Majesty's ships, that if they cannot "obtain a copy of the Addenda to the Admiralty Instructions (which "Addenda are out of print), and if they cannot obtain a copy of "the Regulations for Preventing Collisions at Sea (which have been "issued by the Board of Trade, and are supplied to men-of-war on "demand), they would do well to cut this letter out of a copy of the "*Times* and keep that portion of it which contains the extract from "the existing regulations in their pocket-books for frequent reference; "otherwise, the same fate may await the vessels under their charge

"which overtook Her Majesty's ship 'Amazon,' and the steamer "'Osprey' in the early part of this year."

Now, I was present at the Court-Martial after the collision between the "Amazon" and the "Osprey;" and, standing outside the door, surrounded by the Captain, Officers, and men of the "Amazon," they one and all declared that they had never heard of these regulations, and they supposed if they had been sent on board they had been relegated to the gunner's store. Somehow this came to the ears of the then First Lord of the Admiralty (Sir John Pakington), and he wrote to me to verify it—which I did. Here then was a case of a merchant ship acting under the rules, and Her Majesty's ship acting under no rules at all. Both were sunk, and, besides eleven lives, the country suffered the loss of a fine new ship, fully equipped, besides paying for the "Osprey" to the tune of about £35,000.

Before entering into details as regards the existing rules, and what Sir John Hay proposes as amendments to them, let me call your attention to four points, applying both to the rules for sailing vessels and also to those for steamers. You will notice in both cases the rules begin with the expression—"If two ships." This is utterly wrong; for a man is not only expected to command his own ship, but to be influenced by, if he cannot control, another. Through fog or thick weather, or his eyesight from any cause not being over clear, he cannot tell whether it is green to green, or green to red, and he goes on approaching his object in order to find out!! He finds this out when it is too late, and then probably puts his helm hard-a-port, according to "Cocker."

Sir John Hay says, both as regards sailing ships and steamers, that every vessel shall be a law to herself and mind her own business, and that a steamer having anything on her port or starboard side shall go away from it.

Besides this, there are in both cases "two rules," and it is impossible to say where one begins and the other ends; one vessel may therefore be acting under one rule, and the other vessel under the other. Again, there is the remarkable expression, "If there is risk of collision." What is risk of collision, and how are two men in different ships to know, in order to act upon, what is the risk of collision; because if one thinks that there is risk of collision, he acts according to the rules, whereas the other, if he thinks there is no risk of collision may be acting regardless of them.

The other point is the indefiniteness of language of these rules. It is not a question as to what was the intention of the framers of these rules in using the expression "nearly end-on;" but the law as it now stands by the interpretation and decisions of the law courts is—that a ship having another two points and a half on her starboard side is bound to port and cross the other's path. And the Right Honourable the President of the Board of Trade says, "That it would be very "disadvantageous to appoint a Committee, and disturb in this country "by inquiry any question which all maritime nations at least believe to "be satisfactorily settled."

I will now read to you the custom and practice of the sea, which

Sir John Hay proposes to put into words, and you can compare it presently with the existing law, and say which is the more simple, or likely to be understood by our seafaring population. You will notice that in Sir John Hay's rule for sailing ships, no mention is made of the helm, and in the rules no mention is made of the word "tack," sailors knowing and understanding nothing else.

"A sailing ship on the port tack shall give way to a sailing ship on "the starboard tack; a sailing ship with the wind free shall give way "to a sailing ship close hauled. Where two sailing ships, each with the "wind free, meet on opposite courses, the ship which has the wind on "her port side shall pass to leeward of the ship with the wind on her "starboard side."

Now for the rules.

"If two sailing ships are meeting end-on, or nearly end-on, so as to "involve risk of collision, the helms of both shall be put to port, so "that each may pass on the port side of the other.

"When two sailing ships are crossing so as to involve risk of col- "lision, then, if they have the wind on different sides, the ship with the "wind on the port side shall keep out of the way of the ship with the "wind on the starboard side; except in the case in which the ship with "the wind on the port side is close hauled and the other ship free, in "which case the latter ship shall keep out of the way; but if they have "the wind on the same side, or if one of them has the wind aft, the "ship which is to windward shall keep out of the way of the ship which "is to leeward."

Then, as if to throw doubts upon the minds of men at the critical moment of action—

"In obeying and construing these rules, due regard must be had "to all dangers of navigation; and due regard must also be had "to any special circumstances which may exist in any particular "case, rendering a departure from the above rules necessary in order to "avoid immediate danger.

"Nothing in these rules shall exonerate any ship, or the owner, or "master, or crew thereof, from the consequences of any neglect to carry "lights or signals, or of any neglect to keep a proper look-out, or of "the neglect of any precaution which may be required by the ordinary "practice of seamen, or by the special circumstances of the case."

Then, to simplify matters, the Order in Council which has not yet been concurred in by other powers, is as follows:—

"The said two Articles, numbered 11 and 13 respectively, only apply "to cases where ships are meeting end-on, or nearly end-on, *in such a* "*manner as to involve risk of collision.* They consequently do not apply "to two ships which must, if both keep on their respective courses, "pass clear of each other.

"The only cases in which the said two Articles apply are when each "of the two ships is end-on, or nearly end-on to the other; in other "words, to cases in which *by day* each ship sees the masts of the other "in a line, or nearly in a line with her own; and *by night* to cases in "which each ship is in such a position as to see both the side lights "of the other.

"The said two Articles do not apply *by day* to cases in which a ship "sees another *ahead* crossing her own course; or *by night* to cases where "the red light of one ship is opposed to the red light of the other; or "where the green light of one ship is opposed to the green light of the "other; or where a red light without a green light, or a green light "without a red light, is seen ahead; or where both green and red lights "are seen anywhere but ahead."

You may laugh; but that is the law.

We will now pass on to steamships, the rules being the same, with the exception of the two following, which must be substituted for the two first rules quoted above:—

"If two ships under steam are meeting end-on, or nearly end-on, so "as to involve risk of collision, the helms of both shall be put to port, "so that each may pass on the port side of the other.

"If two ships under steam are crossing, so as to involve risk of colli-"sion, the ship which has the other on her own starboard side shall "keep out of the way of the other."

Sir John Hay, acting in the spirit, although he is no longer able to follow in the letter of the custom and practice of the sea, has put forward the following simple and concise rule:—

"A steamship having another
"end-on shall port,
"on her port side shall port,
"on her starboard side shall starboard, and *stop*."

I beg of you to keep your eyes upon this rule during the various illustrations which I am about to put before you, because, if as a safe rule or guide, it should fail in any one case, I am prepared to abandon it. It will be noticed that if a vessel has another on her port side, she may go on in safety, because, should the other be crossing her path, or presenting her starboard side, or green light, she (the latter) would be bound to turn away and *stop*. For the same reason, if a vessel has another on her starboard side, she should turn her head away, and be prepared to stop, because if the other is crossing her path, she must be presenting her port side, and red light, and is entitled to pass on.

To port the helm and go to the right is the rule, and starboard the helm and go to the left the exception, the one involving safety, and the other danger and caution.

Sir John Hay says the helm, and not what you see, is the first consideration, and that were such a law to be passed, any vessel hereafter striking another with her stem ought to be condemned.

Diagram No. 2 represents what happened to myself, coming over from Antwerp in a dark night. We saw a steamship on our port side, we came together, and we sheered off. Presently we came together a second time, and we sheered off. Then we came together a third time, and sheered off again. Once more we tried it on, and sheered off again, and I do not know what became of us afterwards, for I went to bed; but Sir John Hay says that the steamship having another on her starboard side, shall starboard and *stop*.

Diagram No. 3 represents the collision between Her Majesty's ship

"Amazon" and the "Osprey." The sea was perfectly smooth, with a slight breeze from the north-west. These vessels saw each other five miles off, and as the "Amazon's" fore and aft sails were lifting, and she was going out to the West Indies, the officer of the watch (Sub-Lieutenant Loveridge) starboarded her helm, the look out man shortly after reporting a light two points on the starboard bow; and I would ask any gentleman present if a ship was not entitled to do this—whether the seas would be navigable? I will tell you what afterwards happened; but the following is the decision of the Court-Martial:—"That the collision was occasioned by a grave error in judgment on the "part of Sub-Lieutenant Loveridge, the officer of the watch, in putting "the helm of the 'Amazon' to starboard instead of to port when first "sighting the light of the 'Osprey' (the two vessels being then five "miles apart) in contravention of the regulations for preventing colli-"sions at sea." Sub-Lieutenant Loveridge was cashiered, but recommended to mercy. The finding and sentence were ordered to be read on board all Her Majesty's ships in commission. Now what did the "Osprey" do? She is acting under the rules, and she sees the "Amazon" end-on or nearly end-on, and ports her helm, (these vessels are very fast,) and presently she is steering, not by her compass, but by the light of the other vessel (the "Amazon"), and before the collision, was actually almost at a right angle to her course. They soon come into the position indicated in Diagrams 1 and 3, and Sir John Hay says, "that a steamship having another on her starboard side shall starboard and stop," but the Sub-Lieutenant of the "Amazon," (who was cashiered for starboarding,) thought he could go under the stern of the "Osprey" and put the "Amazon's" helm hard-a-port, but he couldn't; the "Amazon" struck the "Osprey" on her port quarter, wrenched off her own prow, which had been specially constructed for ramming, and both were sunk. Mercifully the water was very smooth, or hundreds would have been drowned, instead only of eleven. The poor captain of the "Osprey" told me that his children, who about an hour before were dancing upon the deck, were all drowned. I shook hands with him, and pledged myself that I would never leave the subject until I had brought it before the country. Yesterday an honorable Member met me, and asked if I was well up in the statistics of the "loss of life and property," but I told him that I wanted no statistics, for if one life was lost through any defect in these laws, Parliament was bound to amend them.

I have told you that the "Osprey" was acting under Rule 13, the "Amazon" was acting under no rules at all, because they had never heard of them. If they were sent on board they were sent—(Captain COLOMB: They were in the Addenda at the time on board the ship.)—I am only giving you what I was called upon to verify, and I did verify it. The Officers and men told me they had never heard of the rules.

We will now take another case, the "Bhima" and the "Nada" (Diagram No. 4). The "Nada" was coming up the Red Sea, and the "Bhima" was going down. The "Bhima" had the "Nada" on her starboard side, and when they were within 600 yards of each other,

she put her helm hard-a-starboard. The "Nada" saw the "Bhima" "end-on or nearly end-on," and she ported. In the case of the "Amazon" and the "Osprey," the "Amazon" put her helm hard-a-port; but now the "Nada," put her helm hard-a-starboard, struck the "Bhima," and sunk her, simply for want of Sir John Hay's rule, "that a vessel having another on her starboard side, shall starboard and stop, and let the other vessel pass." This terrible calamity occurred at half-past seven in the evening on a fine night. The passengers of the "Bhima" had been dancing on the deck just half an hour before; and by that unfortunate collision seventy-nine people were drowned. I say it is a justification for me or for anybody else to force this matter upon the attention of the Legislature of the country.

I will take another case, Diagram No. 5. H.M.S. "Euphrates" going up the Red Sea saw the "Surat" coming down. The "Surat" was a Peninsular and Oriental steamer, carrying the mails. The "Euphrates" had the "Surat" on her starboard side; and the "Surat," seeing the "Euphrates" "end-on, or nearly end-on," ported her helm. But the Captain of this ship was a judicious man. He would not drown his passengers or lose his ship. He *stopped*, and let the "Euphrates" go past, which she did at full speed. He sent in to the Peninsular and Oriental Company a report of what the "Euph-"rates" had done, and the Captain of H.M.S. "Euphrates" made an apology to the Company. The "Surat" was on the right tack, and had the other on her port side, and was entitled to cross the other vessel's path. Instead of that, the "Euphrates" went across her path at full speed. We want a law (that of Sir John Hay) "that if a vessel has another on her starboard side, she shall starboard and stop, and let the other vessel pass."

Further, to show the operations of these laws, this is what takes place in my own country. Diagram No. 6 represents a rough plan of Yarmouth Roads. A vessel is coming in at the Cockle. It is no suppositious case. I have myself seen after a northerly gale, twenty-eight large steamers following each other in succession. This vessel wants to get out at St. Nicholas Gat. She sees one vessel, and if she acts according to law, she must port, she must port to the second, and she must port to the third, and so on in succession. But according to Sir John Hay's rule, she may go anywhere she likes. If she is under starboard helm, she must be prepared to stop, and let another vessel pass, which is under port helm.

Admiral HALSTED: How do you apply the terms port and starboard helm?

Captain COLOMB: Do you mean that she has got her helm over?

Mr. LACON: I should have said, "having another on her port side or on her starboard side." In making a law that a vessel shall port, if she has another on her port side, it does not follow that she should move her helm, unless there is necessity to do so.

In the same way, if you see another vessel's green light on your starboard side, although Sir John Hay says, "a steam-ship having "another on her starboard side, shall starboard and stop," it cannot in this case be necessary to stop, but if you are not sure, if it is foggy,

and you cannot make out what you have on your starboard side, surely it is better to stop than have a collision.

Admiral HALSTED: When a vessel is on my starboard side, is that the same as having my helm a starboard?

Mr. LACON: Certainly not. But if you have got another on your starboard side, you shall starboard and stop if you are not certain of what you are doing.

Admiral HALSTED: Very good; that makes it simpler.

Mr. LACON: Because every case of collision occurs by one vessel running into another with her stem. But according to this plan of Sir John Hay, if two vessels do collide, they would collide broadside to broadside; and we are perfectly agreed upon this, that if in future any vessel should strike another with her stem, she ought to be condemned.

Mr. THOMAS GRAY, Assistant Secretary of the Board of Trade: I should like to ask one question. I do not know whether Mr. Lacon is going to give us time to discuss anything that he has said. I am afraid the time is getting short.

Mr. LACON: I will finish, then, because the other points, though really points of very great importance, have been discussed with the Cinque Port pilots.

I said I would lay before you the "nursery rhymes" which have been mentioned in the House of Commons by the President of the Board of Trade. 10,000 copies have been issued by the Board of Trade, and they have been translated into Danish, German, and Italian, as the "British verses." I do not understand Danish or German, but I do understand Italian, and of all the extraordinary poetry that ever I read in my life, when it comes to be Italian, I think I never saw anything like it. Here is a copy of these rhymes, which have been put into the hands of the illiterate population of the Norwegian and Swedish coasts.

Mr. BRASSEY, M.P: Is that done by order of the Board of Trade of England, or by the order of some other authority?

Mr. LACON: I cannot say whether they were ordered by the Board of Trade of England, but they were issued from the Board of Trade, and sent to all the outports.

Mr. BRASSEY: If copied into a foreign language by naval authority abroad, it would seem to imply that that authority approved of them.

Mr. LACON: I am glad it is a member of the Legislature who asks that question. It is impossible for me to trace how it has been done; but I will ask you to allow me to read them.

"Meeting steamers do not dread,
When you see three lights ahead,
Port your helm and show your red!
Green to green, and red to red,
Perfect safety—go ahead!

"If to starboard red appear,
'Tis your duty to keep clear;
Act as judgment says is proper
Port, or starboard, back, or stop her!

"But when upon your port is seen,
A steamer's starboard light of green,
There's not so much for you to do,
The green light must keep clear of you.

"Both in safety and in doubt,
Always keep a good look-out,
In danger, with no room to turn,
Ease her! stop her! turn astern?"

Now *Punch*, who is a very clever fellow, and says a good many things very much to the purpose, says with reference to this :—

"Meeting steamers do not dread,
When you see three lights ahead;
Port your helm and go to bed!
And if you're smashed, what can be said?"

And, in searching for information to lay before you, I copied the following from a lecture given by Mr. Napier, F.R.S. He says :—

"Meeting steamers I'll not dread:
When I see three lights ahead
I'll port my helm and show my red,
And if I'm smashed, what can be said?

"Green to green—so it's said—
Is perfect safety—go ahead!
But if the lubber port, I say
A collision's likely—Thomas Gray."

I have exhausted my time by a long way. I should like to have gone into points, such as "lights astern" and "danger lights," which are very important, and which have been approved by the Cinque Port Pilots and the French Government. But the result of all that Sir John Hay is going to propose to-morrow night is—and you will see the importance of it as bearing upon the illiterate sea-faring population of the country who have to work them—that these rules are to be reduced from 749 words to 144.

A VISITOR: As a sailor, I must say there never were such barbarous rules made in any intelligent country.

Admiral HALSTED said he sympathised strongly with the benevolent objects of the lecturer, and pronounced the rules as barbarous and defective.

Mr. THOMAS GRAY: Mr. Chairman and Gentlemen,—I have listened with very much pleasure to Mr. Lacon's diverting lecture. I think he does owe me something in having been able to use my verses to lighten up what otherwise would have been a very dull affair. But I take strong exception to the manner in which Mr. Lacon has treated this subject throughout (No, no). But I do. And I have a right. Mr. Lacon has read extracts from Parliamentary papers, but he has not read the whole of the paragraphs bearing upon the points. Mr. Lacon has told you in effect that the Board of Trade sent this Order in Council to the Council Office without the consent of the Admiralty. Now what is the fact? (Mr. LACON: I said that "the concurrence of the Board was never obtained, that the question was never submitted to the Board.") If the notes are correctly taken, I think you will find that in substance what I say is right. At any rate, let me finish what I was about to

read :—" Admiralty, 14th July, 1868. Sir,—Having laid before my Lords Commis-
" sioners of the Admiralty your letter of the 6th inst., requesting their statutory con-
" currence in the Order in Council proposed to be issued on the subject of the Rules
" of the Road at Sea, I am commanded by their Lordships to express to you their
" concurrence in the same. I am, &c. Signed H. G. Romaine. To the Assistant
" Secretary Marine Department, Board of Trade." The Board of Trade are required by Statute to obtain the concurrence of the Admiralty before they can recommend Her Majesty by Order in Council to move in the matter. And the Board of Trade did obtain that statutory concurrence, and that statutory concurrence is in that letter which was in Mr. Lacon's hands, and he never mentioned it. I think it right to point this out, because otherwise you would have assumed that the Board of Trade had gone against the advice and against the wishes of the Admiralty. The truth is, as every one can see for himself, that the Board of Trade and the Admiralty and the Trinity House are now thoroughly at one on the subject. I am not here to defend the Board of Trade. It is not often that in this Institution opportunities are taken to attack the public departments. The Board of Trade can take care of itself. I am merely about to point out to you one or two other omissions on Mr. Lacon's part. Mr. Lacon referred to a French reply which is in the papers. He did not tell you that that French reply was not an objection to the Rule of the Road at all. It was an objection to an answer in what was called a catechism, and he did not tell you further that, after the French had objected to that one point of the catechism, the catechism was amended and sent back to them, and then they approved of it, and do approve of it at the present moment. It is too much the fashion of many gentlemen to speak of the Rule of the Road at Sea as being made by one department of the State. Whereas the fact really is, that the Rule of the Road at Sea was not made by one department or made by one State, but has been made by competent departments in every maritime State in the world. And those maritime States agree to maintain it as it is. It is useless for me to follow Mr. Lacon through the quotations from his papers, or through the cases he has given you. I am very glad to see that he has discussed these rules which are technical, in an Institution like this, where technical points can be discussed, and I hope he will give us another night on which we can really go into the technical part of it, taking to-night as a mere preamble. If we do so, I think, although I am not a sailor, I can show you that his rules are wrong mathematically, and that they must inevitably lead to collisions instead of preventing them.

A VISITOR: Pardon me, if you are not a sailor, and many gentlemen who are sailors who have left the room, have expressed themselves strongly pleased, why do you make that observation?

The CHAIRMAN: The discussion must not degenerate into a conversation. We shall be delighted to listen to you after this gentleman has done.

Mr. GRAY: I must claim the protection of the Chair. The fact of my not being a sailor will give to the gentleman who has interrupted me, if he is a sailor, the power of refuting more easily what I may say.

Sir GEORGE HODGKINSON: I wish to make one or two remarks. I think Mr. Lacon is entitled to very great praise, but I am sure the approval of his own mind will be his best reward. I believe there can be no subject upon which a man can better bestow his talents than the subject which Mr. Lacon has taken in hand for some years past. I had the pleasure some few years ago of seeing Mr. Lacon on the subject. We have not met since that period. Mr. Lacon knows that I have taken a deep interest in this matter. For two reasons, I think Mr. Lacon is entitled to a great debt of gratitude, on the score of humanity, as well as that it is a matter of policy for the country. The loss of property at sea belonging to this country is probably nearly £100,000,000 a-year. The loss of life I do not know, but it is very large. You see, therefore, it is not only a question of humanity, but it is a question of national importance. I do not say how much of that loss is caused by the want of a Rule of the Road, but the tendency of people now-a-days is to carelessness. And whatever can simplify the rules, or the instructions for men to follow, would be a very great advantage. Many people think that we have too much legislation; and some think that we have not enough. I believe the majority would think that if there is to be any legislation on this subject, we ought to have still more. If the

Rule of the Road could be simplified in some way, it would be desirable, though many persons are of opinion that if sailors would act on the rules which previously existed, they would do much better than they do now. Certain I am that greater care would be taken, for Jack is careful of his own life; but he does not care so much for other people's property. That is, his tendency is to carelessness, and if you had to pay claims as we have had to pay, something like £100,000 in one year, chiefly through their carelessness, you would feel interested in the subject, and desire that something should be done to simplify the way in which people go on. We have in so many cases to deal with widows and orphans, that it makes the duty extremely onerous, and me extremely sensitive. Two years ago I addressed to Mr. Bright three recommendations, a Rule of the Road for rivers, the navigation of barges on the River Thames by steam, so as to make the highway practicable, because it is no longer what it used to be; and also the criminal punishment of mariners in cases of culpable negligence or carelessness, especially when loss of life has occurred. I suppose Mr. Bright would kindly take notice of anything I suggested, and a communication was made to the Conservators as to a Rule of the Road for rivers, and I believe they last year re-enacted the Rule of the Road with regard to the Thames. I could illustrate many cases where people have been going wrong without the slightest knowledge. There are two vessels that I instanced, the "Velocity" and the "Carbon," to show how little the rule is understood, and what a necessity there is for some positive rule. At the trial at common law, the jury found for the "Velocity." On the case being taken to the Admiralty Court, the decision was in favour of the "Carbon." On a motion for a new trial in the Court of Exchequer, the verdict of the jury was upheld. I said "Permit me now to acquaint you that "the Privy Council have reversed the decision of the Admiralty Court, having "decided in favour of the 'Velocity,' thus rendering decisions at the common law "totally at variance with that of the Court of Admiralty." Then the Board of Trade wrote to me, and asked me to furnish them with statistics upon which I based my statement, that the Rule of the Road was attended with loss of life and property. My reply to that was, to refer to the want of unanimity in the decisions of the cases of the "Velocity" and "Carbon." Now, with regard to criminal punishment, I quite admit that, in these days of progress, every man works to get money. As a steamship owner said to me, "If we stopped at every light we saw, we should never get to London," and owners would not like to see their men punished. But I do not see any reason why, if your coachman knocks a man down in the street, and is treated criminally for it, and if he is guilty of negligence, he is punished, the same law should not apply to seamen. We have a law, but common juries cannot be got to apply it. They will not use it. What we want is a public prosecutor, and until we get that I do not think much good will be done. The Government do not wish to appoint one. I do not allude to the reasons why they do not. But I think until somebody is appointed in the shape of a public prosecutor, you will find carelessness go ahead in the most painful way. After what I have said, you will not be surprised that I think the lecturer feels on this matter as a human being, as I do, which you may believe when I tell you that my pecuniary interests are against amending this state of things, because a great part of my occupation arises through the carelessness of sailors. I feel, however, that carelessness is so increasing with navigation that whatever degree of perfection you may attain by legislation, you will still have a vast deal of mischief going on.

Mr. TRAILL: I should crave your indulgence for two minutes, and I hope what I have got to say will have some weight. Having had some dozen years' experience afloat, and having the acquaintance of many able naval Officers, I am happy to be able to say in contradistinction to Mr. Lacon, that I do not know one naval Officer who does not know the Rule of the Road thoroughly. Having had very much intercourse with the mercantile marine of the world, and being daily and hourly in intercourse with Captains and Officers, I can only say this, that no people can wish for the Rule of the Road to be more perfect than they can; and I have heard them universally express their opinion that they should be sorry to see any such alterations as Mr. Lacon would wish, and they expressed themselves satisfied with the present Rule of the Road. That man must have a very mean comprehension who cannot understand it. As regards those nursery rhymes, I can only say that the

superintendents of all the best Companies in this country have ordered from the printers some thousands of copies of them, and have distributed them gratuitously among their Officers, considering them one of the best aids to memory to guide them and keep them out of collisions.

Commander W. Dawson, R.N.: The gentleman who has just sat down said that he is not acquainted with any Officer who does not understand these rules. I am sorry that I have not the honour of that gentleman's acquaintance, or he would not be able to repeat that statement. I rise because I do not understand the present manifold Rules of the Road at Sea. I have heard a great many lectures on the subject, and I have read a great many pamphlets, and though I have heard another lecture this evening, I am free to say that I do not yet understand all the various applications of these manifold rules. My capacity is not perhaps very large, still I do not think it is below the ordinary run of our seaport population, and I really find these numerous rules exceedingly difficult to comprehend. I have no doubt that if I were to sit down and really try to study them, that I should be able to understand them as well as the differential calculus, or that if I had large experience of their use, I should be quite conversant with their practical application. But I mean to say that I cannot understand all their bearings off hand, and that they cannot be fully understood without that attentive consideration and close study which I do not think it should be necessary for seamen to give in order to comprehend a common every-day sea rule. I am extremely sorry that Mr. Lacon has thought it necessary to allude so much to the different public departments. I was very sorry indeed that some member checked Mr. Gray in the answer which I think he might have given with some little severity and yet with much truth to the animadversions which were made on the Board of Trade. I do not think that those remarks were at all necessary; whilst they rather diverted our attention from the subject before us. I do not wish, therefore, in any remarks of mine to say anything which would reflect upon any public department or upon any official personage. But I think as honest men standing up in this theatre, we ought to speak honestly what our mind is as to the effect of these numerous Rules of the Road at Sea upon collisions. In the good old time there was an idea that the man who was placed in charge of a ship was the proper person to command her. Now, however, there is an idea that the people who are to manage ships afar off on the high seas, are the persons who sit at comparative ease in certain offices at Whitehall. Those gentlemen who sit at a table in an office undertake to tell Commanders of ships what they are to do with their vessels under every conceivable circumstance. The old rule left it entirely to the judgment and seamanship of the Officer to get his ship out of difficulty. All that was laid down for him was one or two general principles, such as—"If you are "on the starboard tack you are to hold on your course. If you are on the port tack "you are to give way." The Captain of one ship was not to care what the Captain of the other ship thought, or to study how the other ship was to be managed. Now-a-days that is not the case, but every Officer is expected, with hands tied by a set of absolute rules, to command two ships instead of one. He is expected to command his opponent's ship as well as his own vessel. He has to judge of what his opponent is thinking of, and of what his opponent wants to do before he thinks of what he is going to do himself. This appears to me altogether an error in principle. If a principle were laid down by which the attention of each Captain could be exclusively devoted to the movements of his own ship, he would only be required to study the relative position of his own vessel, irrespective of what was passing in the mind of the Commander of the other ship; that would simplify the problems very much. And if that principle could be brought down to the simplicity of the old rule, which was in operation in my boyhood, experienced seamen would not have to sit down to study with so much laborious attention a large number of absolute rules, and to cram their heads with nursery rhymes. Even after a number of absolute rules are understood, it is not easy to determine in a moment on a dark or tempestuous night when a vessel is running very close towards you, and an error of memory might be fatal, which of the nine or ten rules is to be acted under. Acting thus, not on his own judgment and skill but upon memory, the Officer of one ship might by luck hit upon one rule, and his opponent think the case came under another of the nine rules. Even lawyers and judges sitting quietly in arm chairs at Westminster find it often

very difficult to determine that which illiterate seamen are expected to decide off hand in dark nights at a moment's warning with imperfect knowledge of what the other ship is doing. Indeed the decision as to which of the nine rules is to be followed in a given case is rather a lawyer's than a seaman's question. Seaman-like skill is to be thrown to the winds, and the memory of an Order in Council and its official explanations and illustrations is what has alone to be considered. There are many reasons why collisions should multiply under such circumstances. The fact that it requires all these official explanations and official illustrations and so many Orders in Council, and all these lectures to make the present Rules of the Road at Sea understood, even by educated men, shows the difficulty of understanding them. Remember that, in addition to all these official printed explanations, it was necessary for a very high Officer of the Board of Trade, a most intelligent landsman, to go down to the East of London and to personally explain these rules to a seafaring population. I believe that that semi-official explanation was very clear indeed, and that those sailors who heard it understood the rules much better in consequence. But then every seaman was not present. There are somewhere about 50,000 masters and mates in the mercantile marine, and a great many Officers in the Navy. They were, unfortunately, not all in that East-end room, and, therefore, they could not all have the benefit of these personal semi-official explanations. Rules which require explanations upon explanations, whether by word of mouth or by Orders in Council, or by pamphlets, stand condemned by the very necessity of such verbiage. It is not necessary that the rules themselves or the explanations should be wrong, in form, to cause their removal. Such rules and explanations and nursery rhymes might be most valuable in a popular book on seamanship to instruct young men in the elementary portions of their profession. But when such rules and explanations are elevated into hard and fast laws, and are given a legal status, they assume a very different position from that of a midshipman's catechism. They then cease to be advices to young apprentices, and become destructive of all seamanlike experience and skill. Suppose Colonel Henderson were to draw up such precise and absolute rules by which cabmen were to guide their cabs in crossing Oxford Circus, what confusion and collisions would take place. He would have to draw up at least nine or ten rules. But he does not do anything of the kind. The Commissioner of Police supposes that a cabman knows how to drive his cab, and he merely lays down one or two general principles; and he then leaves the cabman to exercise his skill as a driver in getting out of the difficulty in the best way he can. That was the case also at sea in the good old days. We were then told which of the two ships should give way, and that vessel was to get out of the way in such manner as the seamanlike skill of her Commander might determine. But now-a-days a gentleman in a public office on shore sits down at his desk to tell sailors what they are to do under every conceivable circumstance in dark nights at sea. The whole thing appears to me erroneous in principle.

Captain CURME, R.N.: I wish to be considered as speaking merely as a Naval Officer, and not authorised by Lloyd's. I have only lately given up the command of an Indian troop ship, which I had for three years. Whether I understand the rules or not, is for other people to say. I think I do. There may be better ones, but I have never read them. I certainly do not think Mr. Lacon's are. I believe I know our present rules well, because I had taken a great deal of trouble to get them up; and the having commanded one of the Indian troop ships, will be admitted by some of you present to give the right to speak as with some experience. I believe also that the Order in Council of 1868 was a most excellent thing. It struck at the very root of mistakes. Mr. Lacon made a strong point of the detail of "green to green and red to red," &c., being entered into, but it was necessary to do this fully to show people that there are a great number of cases in which it was supposed necessary to move the helm when it was not. All cases are there shown in which it is not necessary to touch the helm, and these being eliminated, it is made plain that there are *very few* cases where it is necessary to touch the helm at all. The Order in Council put this in the plainest language. I consider that every unlearned sailor owes a debt of gratitude to Mr. Gray for those nursery rhymes which have been made so much fun of, because they are excellent for the purpose of helping people to commit the rules to memory. I

cannot tell you how the instructions can be amended. I thought I could six years ago, but I do not think so now.

Captain COLOMB, R.N: Unfortunately I have a good deal to say on this subject; but on this occasion I will not say it. I think, however we may agree with or differ from Mr. Lacon in his views, we must all be quite agreed that he has done his work to-night uncommonly well. I think myself that in those years that he has spent in agitating the subject, he might have effected a great deal more real good than he has done. I cannot say whether it is his misfortune or his fault, but he has the credit of being more an upholder of a particular set of rules of his own or others' devising, and less an upholder of a call which was very strong a little time ago, namely for an inquiry. I am afraid that the urging of a particular set of rules upon a Government department had the effect of checking a full inquiry into the whole subject, and I, having myself made a very extensive—I may say also, a very extended—inquiry into the matter, am quite persuaded that until there is full and complete inquiry held, and a report authoritatively issued by Parliament or some other competent body, we shall perpetually have these questions arising, and we shall have continued disagreements as to what ought to be and what ought not to be the Rule of the Road, and a constant increase in the number of collisions. Now I do not speak altogether without book. Before the loss of the "Amazon" and the "Osprey," it was my duty to go into this question of the Rule of the Road officially, not as to altering the rules, but because I discovered that the then Admiralty Rules, and the Board of Trade Rules, so to call them, exhibited a great discrepancy, and the question was whether our Admiralty Rules should be retained with the Board of Trade Rules, which had already been authoritatively issued to the Navy or abolished. In the middle of this inquiry came that wreck. After that time Captain Brent and I examined all the collision cases which had been tried in the Admiralty Court for the ten previous years, and since then there is hardly a collision case which has been reported in the public press which I have not examined and analysed. It is my habit to this very day every morning to read in the columns of the *Shipping Gazette*—where there is a perfect mine of wealth of that kind—to read the collisions reported since the previous day. In this way I have arrived at some very distinct conclusions. One is that the danger point for ships meeting is, as I have drawn it on the diagram, when their courses differ and cross at an angle of two points; the situation then exhibits the maximum danger, as ships whose courses cross at less than two points, as between those whose courses cross at more than two points. Then I have come to another very distinct conclusion. The facts which precede collisions are almost invariably these:—"X," as you see, observes a ship, or a light a little on her port bow, and she immediately ports. "Y" sees a ship or a light on her starboard bow, and she immediately starboards. These measures are taken as a matter of precaution. The result is, that they remove the point where the courses are crossing further to the right. But in doing that, both ships, as they are advancing, draw nearer to that point, and are getting into greater danger. Whether these be two steamers, two sailing vessels, a sailing vessel and a steam-vessel, these are the facts which generally precede collisions. We may look at what the number of the collisions are. These figures I have taken from the publication of Lloyd's Statistical Committee. They are worth notice. In 1866 there were 1958 collisions reported, of which 198 ships went to the bottom. In 1867 there were 2062 collisions reported, and 185 ships went to the bottom. In 1868 there were 1923 collisions reported, and 169 ships went to the bottom. In 1869 there were 2185 collisions, of which 157 ships were destroyed. The figures for 1870 are not yet obtainable.* I think simply on that statement of figures, without going one step further, you see that there ought to be a thorough inquiry into this subject. Not the adoption of any particular writer, not taking up this idea or that idea, but to go directly to the fountain head, ascertaining, classifying, and setting out exactly how the collisions occurred, and then we shall be able to apply a remedy, but not before. At present it is not known, and it is not considered generally, how collisions occurred, and that is for the very simple reason

* The figures for 1871, not yet published, but since kindly furnished to me by Mr. Jeula, are—collisions, 2561, ships sunk, 176.

that it requires a great deal of hard work to get at it, and there are few people who have sufficient interest in the matter to take the subject up in that careful way. Now on the question of the Board of Trade action as to the rules, I hold it to be right in one respect; while, on the other hand, I greatly regret it. Before the explanations were issued in 1868, the Board of Trade had it in their power to have opened the question, and to have appointed, as the Admiralty wished, a Committee of Inquiry, who would have gone into the whole matter. Instead of that they did what I cannot altogether condemn, as I think it was a move in the right direction. They issued an explanation tending greatly to limit the indiscriminate use of the port helm, which was before that one of the greatest causes of collision. But when the Board of Trade issued the explanations, in terms, so to speak, of the lights carried by the ships, they ought at the same time, without a moment's delay, to have looked into the question of this carrying of the lights. That they did not do in any efficient way until last month. I must say in the orders that they have now issued to their surveyors, they have gone a great way, quite as far, perhaps, as any apparently larger description of legislation could have gone—I say they have gone a great way towards limiting the number of collisions by night. It is important to understand that it is by night that we want to limit the collisions. Ships are very seldom sunk in the day time. Two-thirds of the collisions that happen occur at night. Those collisions which happen in the daylight are attended with minor damage, and loss of life is rare. But at night the heavy collisions occur, and the greatest loss of life takes place. The Board of Trade have issued instructions to their surveyors, which go far towards restricting the law of port helm in a still greater degree. But it is not yet quite right. There is a growing danger that the law of "port-helm," that is, the indiscriminate porting of the helm, will become again the custom, unless the greatest possible care is taken of it. Only the other day in the Bristol Channel there were two ships, the "Leopard" and the "Northumberland." The "Northumberland" saw three lights very nearly right ahead, and in obedience to the order, she put her helm to port. The "Leopard," on the other hand, saw only a green light on her starboard bow; she did nothing; there was a collision, and the "Northumberland" was necessarily condemned in the Admiralty Court. All that remains to seamen of this judgment is, that it is still as ever, a safe thing to put the helm a-port. That judgment followed from a faulty fitting of the lights; and the danger of making your law in terms of the lights, is the difficulty of getting your lights to comply accurately with the law. Another point with reference to the explanations. Mr. Lacon stated that the Admiralty Court had refused to recognise the explanations. I think that is a strong term. I know two or three cases where a ship has been condemned by the Admiralty Court, for not porting her helm recently, where, if the explanation had been taken as the rule, they would not have been condemned. And though it is a strong term to say that the Admiralty Court refused to recognise them, it is not too strong to say that they are not yet sufficiently binding upon the Admiralty Court. The consequence, of course, in such a case as the "Leopard" and the "Northumberland," and the "E. S. Webb"—a very well known case—the tendency of both those cases, when the ship which ports is exonerated in the Admiralty Court, is still to encourage seamen to put their helms to port. I regret the Board of Trade action so far, because I think if they had inquired, they might have succeeded in obtaining a sound law, which would have bound the Admiralty Court, and about which there could be no doubt whatever.

The CHAIRMAN: Our time is past, and unless any other gentleman wishes to address the meeting, I will call upon Mr. Lacon to reply.

Mr. LACON: I have no other answer to make but this, that I do not advocate any particular rules. I have brought this question before you; but there is an honourable member present to-night who knows that for the last eight months I have been urging the question of inquiry. Through him I have urged upon Her Majesty's Government to appoint a Royal Commission, because if you have a Royal Commission you can appoint upon that commission such men as Sir Alexander Milne, a man who occupies a very high position as a naval man in this country. The Government has not done so, and the question comes on in the House of Commons to-morrow night; Sir John Hay's motion is only for inquiry.

The CHAIRMAN: Allow me to return your thanks to Mr. Lacon. If only on the

humanitarian side of the question, the importance of the subject cannot be over-rated. There is no doubt that great good will follow from a full discussion of the subject.

NOTE.—Mr. Lacon wishes to insert the two following rules, of which Sir John Hay has given notice in the House of Commons. There was no time to introduce them in his lecture, but they have received the approbation of the Cinque Port pilots, and the first also the concurrence of the French Government.—ED.

Lights Astern.

"Any vessel with fixed lights under weigh, seeing the lights of another approaching, "where her own lights cannot be seen, shall exhibit or wave a white light until such "vessel has passed."

Danger Light.

"Any vessel ashore or aground in any channel or fairway, shall extinguish her "fixed lights, and shall exhibit two white lights, placed horizontally about 3 feet "(1 French metre) apart, at the same height from the deck as the anchor light above "enjoined to be carried."

LECTURE.

Friday, May 17th, 1872.

GENERAL SIR WILLIAM J. CODRINGTON, G.C.B., in the Chair.

"THE RUSSIAN ARMY."

By Lieutenant CHARLES E. H. VINCENT, 23rd Royal Welsh Fusiliers.

MR. CHAIRMAN AND GENTLEMEN,

Ere I enter upon the subject of the lecture that I am about to have the honour of delivering to you, it behoves me in a measure to explain my presumption in appearing in this theatre in other character than as one of the audience.

When I recently returned from Russia, I was no less flattered than surprised to receive an invitation from the Council of this Institution to read a paper on "The Russian Army."

Although my journey had been undertaken entirely at my own instigation and expense, in order to learn the language, I had been afforded such unusual opportunities of studying Russian military organisation, by the condescension, kindness, and courtesy of the Generals and regimental Officers quartered in Warsaw, that after some consideration I decided to avail myself of the privilege offered me by the Council; but, I did so only with the conviction that I might rely upon your kind indulgence to pardon any errors into which my inexperience might lead me, or any deficiency in capability of welding my matter into an interesting and complete form. I little thought, however, that I should be assigned the difficult task of replacing so able and experienced an Officer as Surgeon-Major Wyatt, whose inability to fulfil his engagement through indisposition you cannot fail to deplore less than I do myself, and I must further claim your consideration on account of the very short time that was allowed me to prepare my lecture.

Figures are stubborn, indigestible, and uninteresting facts; their citation must be wearisome to all, but unfortunately they are the only means by which numerical force can be designated, and, unless I err, numerical force is one of the chief features in the military organisation of a country. However, I will endeavour to be as sparing as possible in this particular.

Although in describing the Russian military organization I shall use the present tense, it is well that you should understand that some of the provisions relative to length of service, levying, reserves, &c., are only in contemplation, or exist only in theory; no time having elapsed for them to be put into practice.

How necessary army reform was in Russia you will readily comprehend, when I tell you that under the old system, the soldiery were taken exclusively from the very lowest class of peasantry, by a complicated system of forced service; that the Officers were deficient in number, character, and education; and that no defined system of reserves existed. The Reorganisation Commission has but just concluded its labours, and its measures still lack the Imperial sanction. However, there is sufficient reason to believe that they have adopted the primitive project of reform as laid down in the ukase of November 16, 1870, somewhat modified it may be, to justify my speaking of it as actually existing, although the whole system is really only *in transitu*.

Rather more than seventeen years ago, the Emperor Alexander II succeeded to the throne of All the Russias, vacant by the decease of his father Nicholas. The constant news of the bitter sufferings of the imperial troops, and of their adverse fortunes before the Allied Armies, served not to soothe the latter days of that austere monarch. On a camp bedstead, in a poorly furnished chamber, appointed by himself, in order to share in a measure the hardships of his soldiers, the Emperor Nicholas Ist breathed his last, and the autocracy of Russia passed into the hands of his more liberally-minded son.

The position of the Emperor Alexander Nicholaievitch,* on his accession, was one fraught with difficulty—engaged in a hopeless contest, which absolutely impeded all commerce and enterprise, and brought distress and ruin to nearly every door. Peace was a matter of necessity, and in little over a twelvemonth, the treaty of Paris checked hostilities, and freed Russia of the invader, without any serious concessions on the part of the defeated. On a long period of peace and prosperity the future of Russia now depended, and to carry out such a policy was the firm resolve of the Emperor.

A deep and searching inquiry into the evils existing in every civil and military institution; the consideration of the best means for removing them; and minor innovations, occupied some years, until on the 3rd of March, 1861, the decree went forth proclaiming the emancipation of the serfs from their dependency on their proprietors. That decree forms the great modern landmark in Russian history; it enables all owing allegiance to the Tsar to strive on terms of equality in the market of intellect and industry, and in future ages every Russian will have to look back to that decree as the true source of the greatness and prosperity of his country, and it will be for ever associated with

* The "vitch" after the name of a man signifies "the son of," and "effna" after the name of a woman, "the daughter of." Thus, "Alexander Nicholaïevitch"—Alexander, the son of Nicholas; "Katerine Alexandreffna"—Catherine, the daughter of Alexander. It is the custom in Russia thus to address people, even strangers, without prefix or surname.

the name of its Imperial promulgator, and his faithful and zealous commissioners, the Generals Rostovzoff and Milutin.

But I must not permit myself to dwell longer on the civil administration of the Emperor Alexander. I must pass on at once to the remarkable reforms effected in the Army, which can only be spoken of with respect by Englishmen, when they think of the salient proofs of courage it gave, contending as it did in the Crimea against such fearful odds.

The Polish insurrection, and the campaigns in the Caucasus, were events almost forgotten when once over, and brought little teaching; but the war of 1866, and the mighty hosts which battled in the Bohemian arena, clearly indicated the necessity for securing on a firmer basis the constant supply of the proper complement of warriors to defend the honour, safety, and integrity of Holy Russia.

Austria lost no time in profiting by the lesson so direfully read her by Prussia, and Russia made equal haste to reap the benefit of the brilliant example of one rival, and the bitter experience of another. Accordingly, on the 16th of November, 1870, an imperial ukase was issued, proclaiming the liability to military service for every Russian male.

It now fell to the lot of the Minister of War, Infantry-General Milutin (brother of the emancipation commissioner), assisted by the aforementioned commission, to arrange the details of the new system, to organise and dispose the vast force thus obtained into separate bodies, affording each other mutual support, capable of immediate concentration, yet not so massed as to nationality or locality as to admit of the outburst of independent political feeling. But these were not easy conditions to carry out in a country extending over 7,770,882 square miles, with yet imperfect railway communications, with a male population of over 36,000,000, and with a portion of the empire decidedly disaffected. Were the new law of universal service to be carried out to the letter, and all males of a serviceable age called to arms, a force of some 6,000,000 would be the result, or 4,000,000, allowing a liberal margin for those physically unfit, or otherwise exempt.

Now an available army of 2,000,000 troops was justly considered sufficient to meet all due requirements of the empire, either for internal or external war, and a period of about ten years was allowed for it to reach that maximum number. It was, therefore, computed that an annual contingent of 25 per cent. of the youths who had attained their 21st year would furnish a sufficiently numerous body to keep up the standing army, to augment it to full war strength, and to keep it constantly supplied with fresh men, trained in the regular service, by the formation of strong and reliable reserves. But the remaining 75 per cent. will not be freed from their share in defending the soil, for, organised locally, and drilled periodically, they will be bound to serve till the completion of their 36th year in the militia, to whom in time of war the preservation of order in the interior, the garrisoning of the towns and fortresses, and the levying and training of the recruits for the field forces will be confided. Thus the whole of the bayonets composing the active army of the Tsar will be free to take the field against

a foreign foe. The selection of this more or less fortunate moiety, according to the feelings of the individual, will be decided by the drawing of lots; those that fall within the prescribed number being theoretically allowed no exemption by birth or fortune (practically a substitute will probably be obtained on the present terms, 800 roubles), although, of course, certain social and physical conditions may assign an available conscript at once to the militia, and preclude him from the drawing.

The period of service will extend over fifteen years, from the end of the 21st to the termination of the 36th year. In the case of those destined to serve in the regular army, seven or eight years will be spent with the standards, and the remainder with the reserve. Many, however, desire that the former period shall be reduced to five or six years, according to the capacity of the individual, so as to lessen the number of men on foot in time of peace, and that the soldier may go as soon as possible, and propound among the still benighted lower orders the teaching and education he has derived in his regimental experience. Although it is reasonable to suppose that five or six years is sufficient to form a soldier, the proposition is dreaded by those accustomed in their youth to see a soldier serve for life, or until incapacitated by wounds and infirmities.

The supreme direction of the Russian Army lies with the Emperor, who has his Chancery at the Ministry of War.

The Minister receives and prepares for His Majesty the reports of the twelve chief sections, among which the administration of the Army is divided. These twelve departments are—

1. The Imperial Chancery.
2. The Council of War.
3. The Superior Military Tribunal (Court of Cassation).
4. The Chancery of the Minister of War.
5. The Head-Quarter Staff, administering the cavalry and infantry, with their technical schools, and having all staff corps and institutions under immediate control.
6. The Intendance Department for the pay, supply, and clothing of the Army.
7. The Artillery Department, administering the artillery, with its technical schools.
8. The Engineer Department, likewise administering that branch, and controlling all matters connected with fortifications, and the quarters of troops.
9. The Army Medical Department.
10. The Educational Department, controlling only preparatory schools; technical academies being managed by their several departments.
11. The Administration of the Irregular Troops.
12. The Department of Military Justice.

Since 1864 Russia has been divided into fourteen military districts, besides the Cossack Province of the Don. These districts are—

1. St. Petersburg.
2. Finland.
3. Wilna.
4. Warsaw.
5. Kieff.
6. Odessa.
7. Harkoff.
8. Moscow.
9. Kazan.
10. Caucasus.
11. Orenburg.
12. West Siberia.
13. East Siberia.
14. Turkestan.

At the head of each district is a general Officer, who, if simultaneously invested with the civil administration, is termed "Lord Lieutenant" (Namiestnik) in Poland and the Caucasus; and in Finland, Wilna, Odessa, Siberia, and Turkestan, "Governor-General." The head-quarter staff is divided into—

1. The District Military Administration.
2. The Intendance Department for pay, supply, and clothing.
3. The District Artillery Department.
4. The District Engineer Department.
5. The District Medical Department.

Moreover in each military district there is a superintendent of the local troops, termed "local divisioner," and in each government a "local brigadier," who, besides commanding the local troops, is charged to keep the whereabouts of the men on furlough in view, and when occasion arises, with the levying of them.

We see, then, that the Army is distinctly divisible into three heads—

1. The Field Army, composed of the standing Army, augmented by its reserves of trained soldiers.
2. The Irregular Troops, consisting of both cavalry and infantry, and who are raised only in time of war.
3. The Militia or local forces, who have but a *cadre* peace establishment, and who may be supplemented to any extent by a *levée en masse* of the population.

It is, however, almost entirely the first category that must occupy us this afternoon, *i.e.*, the standing Army and its reserves.

The standing Army is composed of the troops of the Guard and the troops of the Army or line, the former possessing enormous privileges over the latter; in interchanging, rank in the Guards is two places higher than in the line, each composed of infantry, cavalry, artillery, and engineers. Although all, or nearly all of the regiments are designated by the names of localities or of illustrious personages, as well as by their regimental numbers, they are in no way tied to fixed localities, nor do they draw their recruits or receive their reserves from particular districts. No doubt much valuable influence of local pride, old association, and *esprit de corps* is thereby lost; but such a system is rendered partially necessary by the vast area of the country, the imperfect communication, and the disaffection of some provinces.

The tactical and administrative unit in time of peace, is the Division for cavalry and infantry, and the Brigade for artillery, engineers, and rifle corps. In time of war these several units are drawn into *corps*

d'armée, and the corps into armies, and employed as necessity and occasion require.

The field troops of the Russian Army are composed of 47 divisions of infantry, 8 brigades of rifles, 10 divisions of cavalry, 50 brigades of field artillery, 8 brigades of horse artillery, 5 brigades of engineers, with a numerical strength (according to semi-official, but not absolutely reliable documents) in time of peace of 33,043 Officers and 735,539 men, and in time of war of 43,355 Officers, and 1,358,672 men, with 1,656 guns.

The cost of each soldier is about £25 per annum, and the war budget amounts on an average to about £21,000,000 sterling.

I ask you, now, gentlemen, to associate yourselves with the conscript. According to your talents, physical appearance, and proportions, you are assigned to one of the arms of the service, and while superior mental faculties procure you admission to the scientific corps, a long thigh, and previous association with horses, will be your special qualification for the cavalry. The recruits for the cavalry of the guard are selected by the Grand Duke Nicholas Nicholaievitch, the elder, himself. Recruiting in the provinces is not left to the local authorities, but is superintended in each district by a special Imperial Commissioner, appointed annually.

After six months' preliminary training with the district reserve battalion, squadron, or battery, where you receive your first uniform, you are appointed to a regiment. Unless personally gifted by nature, your lot lies with the Army; were it with the Guard, you would be housed in barracks, wooden sheds, truly, and with 70 or 80 comrades in the room, but yet more comfortably located than if billeted in a peasant's hut. The erection of barracks is projected for the whole Army, but it must be long ere they exist. Meanwhile the regiments are billeted in the towns, and when sufficient room is not to be had in one locality, they are quartered in contiguous villages. During the summer months, May to October, the whole regiment is brought together under canvas. Eight years (but shortly it will be less) you spend in this way, and then you cast aside the permanent military yoke, and repair to the reserve. Perfectly free in all your actions, you can reside where it pleases you, and change your residence at pleasure, being only required to signify your movements and actual address to the local authorities. On the outbreak of war you are summoned—if your address is known—and are attached to the nearest regiment at hand of your branch, where arms, clothes, and equipment sufficient for the complete war establishment lie in store. I said, "if your address is known," because it is feared that many a Muscovite warrior omits to give his correct address to the local authorities, and that on the call to arms, more than one voice would not be heard when the roll was read over on the day of rendezvous.

But absolving you from your connection with the Russian conscript, I must retrace my steps, and enter upon his regimental life. Docile and willing though he be to learn, hitherto fortune has not afforded the opportunity to him or to his fellows, and the long frosts and heavy snows of winter, which prevent all military exercise, besides an occa-

sional route march, must be taken advantage of, to instil the education so necessary to the welfare and social development of a people. Nearly every day, then, from November to March, for four or five hours, the Officers do the duty of schoolmasters, and the captain, or subaltern Officer under his direction, takes the greatest interest in the relative progress of his men. Periodical examinations take place, when a small prize in money, or the favourite spirit (oodki), or the accordance of some special privilege, is sufficient to excite the greatest emulation. The teaching comprises arithmetic, reading, writing, and simple lectures on military art, illustrated on the black board.

But it may well be thought that in so poorly educated a body the difficulty of obtaining suitable Non-commissioned Officers must be immense. So it would be if the Russians had not met the difficulty in the face, and adopted such resolute measures as not only to counteract it, but also to form a body of men who, after the termination of their military service, are admirably suited for the posts of national school masters, the want of whom is one of the chief obstacles to the educational progress of the country. Forgive me, then, if I enter somewhat tediously on what is one of the most remarkable features in the Russian regimental organisation.

In every regiment of cavalry, or infantry, or battery of horse artillery, or brigade of field artillery, there exists a Non-commissioned Officer's school, conducted by two or three Officers entirely told off for that purpose. Such men, who are of good appearance and character, who can read, write, and sum, are eligible to enter the school, after two years' service, if they have attained the grade of Lance Corporal. Going through the school, however creditably, does not ensure promotion to the non-commissioned ranks, it only entitles to it; skill in arms, tact in command, and physical aptitude, are necessary qualifications for the first graduate. The course of study lasts two years; during the first, the more elementary subjects of education are attended to, such as history, geography, arithmetic, composition; and in the cavalry and artillery, elementary veterinary surgery, &c.: whereas during the second year the studies are more military, and include military history, field fortification, tactics, and also mathematics. You may smile at the word "mathematics," but you must recollect that the Russian Army is the school of the country, hence the necessity of giving a sound general education; and you would have been no less astonished than I was to see a pupil selected apparently indiscriminately by the General accompanying me, and ordered to bisect a given straight line, according to Euclid, on the black board. You would have been astonished, too, on entering a regimental schoolroom, to find the men listening to a lecture on tactics, and to see a relief-model of the environs; on inquiring its purpose, for the General to order two pupils to stand out, to hear him give them an extended operation to work, the one to advance with such an object against the other defending; to see painted tin models of companies and battalions at once worked, and when the General stopped the really sham fight, to hear each of the men in turn give a succinct account of his movements, dispositions, and intentions, corrected now and again by his

Officers, but never assisted; to see another man stand out and make his dispositions for throwing an advanced guard across the Vistula, describing them the while. Nor would your astonishment lessen when a fourth pupil described the general geographical features of England, enumerated our chief towns, traced the course of our rivers; when a fifth, starting from London, followed the track of a ship to St. Petersburgh, naming the countries, their several capitals and sovereigns, by which he passed; when a sixth, starting from some far distant spot in Russia, traced the course by canals to St. Petersburg, enumerating the principal places on the route, and their capabilities for billeting troops.

You may think, gentlemen, that I am exaggerating, but you have, I am sure, but to steer eastward to have the opportunity of verifying my statements, met, as I know you will be, with the courtesy, hospitality, and frankness which distinguish Russian Officers. Meanwhile accept my facts. The pupils may have been selected, but I have no reason for supposing them to have been so, especially as I am not referring to any one particular regiment.

In the summer, field fortification is taught out of doors; but in the winter, when all earth is hidden by many feet of snow, a box about six feet by four, filled with sand, answers the purpose. In one class-room I saw this box, in it were various beautiful models of field works. I expressed a wish to see the pupils at work. In an instant the surface was as level as this table, the four first men stood out, and in twenty minutes, with tiny wooden scoops, a cavalier and a sunken battery were thrown up, with revetments as firm, and slopes as regular as all the time and all the skill of an army of engineers could make them. A sufficiently good scholar may pass at once into the first class, and thus absolve himself of the school in one year. The pupils are entirely separated from the men, living, sleeping, and eating apart, although they generally revert to their companies for the great annual manœuvres. You can easily imagine what a highly trained set of Non-Commissioned Officers such a system must form.

A commission is within the reach of any non-commissioned Officer who passes the necessary examinations; if these examinations be passed and the commission not accepted, an annuity of about £15 is added to the pay during service.

I will now pass from the subject of education to that part of the soldier's life which he shares in common with all men, the amount he earns, and what he eats and drinks. Miserably paid, and almost worse fed on that which is not calculated to make men thrive, on black bread, on a sprinkling of meat, mixed up with rice and a herb which makes it sour; with "quass," a terrible sour, perfectly non-intoxicating beverage to drink, the Russian soldier flourishes, and so flourishes that he can endure almost anything. His spirits and good humour, too, never flag; and in every company, squadron, or battery, there is a musical troupe, who sing and dance admirably. When marching at ease, the troupe always goes in front, and enlivens the route by comic singing and curious antics, although they never lag or get in the way.

The question may be asked, is the discipline of the Russian Army all that it ought to be? If discipline is measured by the amount of crime, Russia yields the palm to no country. Drunkenness exists, but to no great extent. The men are honest (the company's cook goes alone to market to purchase the day's provisions) and submissive as individuals to any degree. Two or three prisoners in the morning is not an excessive allowance to three battalions. Is discipline, then, to be estimated by the respect shown to Officers? Again Russia is nothing behind, for saluting and military attitude in address is never disregarded.

But now and again you are confidentially told that the orthodox cry of Russian soldiery when ordered to execute something, "we gladly obey" ("Radi staratsyah"), comes out sulkily or is replaced by a dull growl. I dare make no assertion on this score; but in speaking of discipline, we must speak of the Officers, on whom it so much depends. I would that I could avoid mentioning them. For all the kindness and hospitality they showed me, and which I can never forget, they are justly entitled to the warmest expressions of my thanks, yet I must honestly state my opinion, and I know them to be too right-minded to misinterpret my sentiments.

The non-existence of what the Germans call the "Kleineadel," and we the squirearchy of a *haute bourgeoisie*, a class blessed with small pecuniary means, yet endowed with the proudest patrician feelings, renders the question of officering the Russian Army one of most serious difficulty. Although Russia is essentially a military nation, where uniform is the only passport, the attractions of the bar, of commerce, of literature, and of art, are every year luring more and more Officers to change their ill-paid and hard worked profession. Ere long, the Government will have to take very stringent measures, for now at least 5,000 Officers are wanting, and principally in the scientific corps, whose members have been called away to construct and superintend the new railways, roads, and bridges all over the country. Another very serious element in the present Officers of the Russian Army is the number of Germans, whose presence in certain contingencies would be a great embarrassment; but they could ill be spared, either as to ability or numbers.

I will not ask you to follow me through the entire curriculum of an Officer's studies; suffice it to say that military preparatory schools exist in great numbers, and receive pupils from a very early age. Those who decide on the military career, proceed at about 16 to one of the technical schools, from whence at the age of 19 or 20, having passed the ordeals which block every stage, they obtain their ensigncy, then follow the various grades without further examination. A second captaincy is reached in about eight years' service, and then merit may give the epaulettes of a general in a very short time (*i.e.*, 9 or 10 years), or you may be left to languish in command of a company or battalion, awaiting the gazette and the promotion, which never come.

An effort is being made to assimilate the off-duty life of Russian Officers with our own, by the establishment of regimental messes, but expense and the habits of the country put great difficulties in the way. Forbidden on any account to appear out of uniform within the confines

of the empire, as Russian Officers are, the reputation of the entire class frequently suffers from the delinquencies of a few members, and would those agitators who desire to see British Officers wear their uniform in public but visit a few of those places of more popular than proper entertainment abroad, and there witness the scenes they wish to reproduce in these islands, English Officers would have little cause to fear that one day the outward sign of H.M.'s commission, the uniform, the coat of honour, will lose the influence and prestige it now possesses, by too frequent and vulgar association.

I said just now that the Officers themselves instructed the men. Now it is quite open to doubt whether employment in such non-military capacities, and the constant intercourse therein involved, add to their reputation with the men, and the respect in which they are held.

It is curious how far the usages of society between equals are observed between the Officers and the men. A subaltern drilling a ride or a squad, a Captain inspecting his company, a Commanding Officer holding a parade, a General reviewing his brigade or division, always commences with the salutation "Zdaróvyah rebarta" (good health my children), to which the men reply, "We wish it also" (adding the title of the Officer they address), and when on Imperial parades, the cry, "We wish good health also to your Imperial Majesty" (Zdarovyah jeliém váse Imperátorsko veléchestvo) peals forth from forty thousand throats, the effect is superb. Yet the inconvenience of having to greet each individual soldier in your path must be great.

The degree of education possessed by Russian Officers varies considerably between the Guard and the Army. The supposition that every Russian Officer is a good linguist is entirely erroneous. In the cavalry of the Guard, nearly all know French colloquially, many speak German, but few can write grammatically in either language. In the infantry of the Guard, such knowledge exists in a smaller proportion, and in the troops of the Army it is a very great exception to meet an Officer conversant with a foreign language.* The theoretical training of young Officers is but little attended to, though the practical teaching is very extended. In some garrisons and towns, military conferences are held, and but little else is done at present. Candidates for the Staff are required to pass through the Nicholas Staff Academy at St. Petersburgh; but the number who offer themselves is so comparatively small, that many Staff Officers have to be appointed directly from their regiments. It is in the numerical and intellectual deficiency of Staff Officers that one of the weakest points of the Russian Army lies. By a recent regulation, promotions in the Staff corps will not take place without an interregnum of regimental duty.

In the case of first commissions there is no probationary period, but an Officer of the Army desiring to enter the Guards, by which he loses two ranks in seniority, is put on his social trial for six months, during which he wears his old uniform before he is definitely accepted. Promotion goes

* The fact that their language embraces nearly all the sounds of European tongues enables Russians to acquire a far greater purity of accent in foreign dialects than is attainable by other nations, and hence the foundation of the popular error.

by seniority up to the grade of Lieutenant-Colonel, whence it is so entirely by selection that none have access to the seniority lists. There is no printed nominal roll of the Officers. About six weeks' leave of absence is granted annually, but the accumulation of two or three years is frequently taken advantage of for purposes of foreign travel. The pay is miserably small, although increased of late, but it is supplemented by periodical pecuniary rewards for the satisfactory performance of duty. Another rather curious custom is the giving of orders and decorations; yet the pay is so small that perhaps it is necessary to establish some equivalent. The breast of many a youth who has never seen a shot fired in earnest, glitters with ribbons and orders, though lacking the cross-swords which distinguish those obtained in the field. The possession of one order for a certain length of time entitles to another, and so on. The desire to obtain these flimsy ornaments is astonishing, and is well illustrated by the reply of a young, rich, and smart Officer of Cavalry to my query as to why he accepted the monotonous post of quartermaster (the regimental paymaster and quartermaster are appointed by the Commanding Officer from the subaltern rank, and held during his pleasure), "C'est evident on peut obtenir des décorations;" one or two years in such a post entitling him to some order, which in time would be supplemented by a handful. Russian Officers are allowed to marry, but must first deposit 5,000 roubles as a guarantee that they possess the means.

There are four departments, which belong to every branch of the service, the Ecclesiastical, the Transport and Commissariat, and the Medical. To every regiment and battery is attached a clergyman; and in every barrack or camp is an appointed place for divine worship. Attendance is entirely voluntary, but there are very few absentees. The Russian soldier shares the religious character of his countrymen. A church in sight, and the soldier, the sailor, no less than persons of their class in other walks of life, will take off their caps and devoutly cross themselves. Few men, and no company, squadron, battery, or regiment are without their patron saint, whose image they always keep near them. On the march and in the field, this picture has its place in the baggage waggons, and at nightfall, be it where it may, it is surrounded by devout worshippers, whose prayers are led by a chosen non-commissioned Officer.

It is in the solution of that difficult problem, "Army Transport," that General Milutin has perhaps excelled. In Russia all military transport is managed by the several corps. Every cavalry regiment has its waggons, in peace and war, at the rate of one transport waggon per squadron, for six days' provision, and one ammunition waggon per regiment, with 30 rounds for each carbine, and 20 for each pistol. Every infantry regiment has its one three-horse transport and one ammunition waggon per company; the horses belonging to the regiment and being driven and looked after by them. In peace, but one waggon, and that horsed by only two horses, is kept up per company. If the Officers cannot find room for their baggage on the squadron or company-waggons, or on the one extra allowed them, they are per-

mitted to have their own conveyances. The horses are generally driven in hand by one soldier. The transport waggon contains provisions for six days, and the ammunition waggon 40 rounds per man. Besides the one transport and the one ammunition-waggon per company, each regiment has an orderly-room waggon,—which contains the lithographing press, by which all regimental orders are printed and sent to each Officer—preventing the necessity of playing hide and seek with the orderly corporal,—the pay-office waggon, four ambulances, one hospital cart, one medicine cart, and the 1st regiment of each division; a band-waggon, but these are horsed only in time of war.

With regard to the Commissariat, it is impossible to say how far it is prepared to stand the test of an external campaign.

Although the deficiency of medical officers is very serious (but much less so than during the Crimean war), the Medical Department of the Russian Army is well administered, or rather, the regulations which govern it, are wise and provident. To provide a due number of surgeons, the Government gives a free education at the medical college at St. Petersburgh to such students as engage to serve three years in the Army when called upon. In the field each company is attended by an apothecary provided with proper medicaments and surgical appliances, besides which the officers' servants and unarmed men are formed into a body, working in action by companies, taught and instructed in the leading principles of military surgery, and drilled periodically in the most approved methods of removing the wounded from the field, and affording them temporary relief. Moreover, in many regiments, the senior surgeon gives periodical lectures to the Officers and men on the first steps to be taken when wounded if skilled assistance be not at hand—a system, the utility of which it is not for me to enlarge upon—and it is in contemplation to provide each man with a roll of lint. The present sanitary condition of the Russian Army is considered to be in all respects satisfactory, although consumption and rheumatism brought on by the poor lodging-accommodation of the troops, are decidedly on the increase. All slight cases are treated in the regimental hospitals, whereas specific and serious diseases are sent to the divisional hospitals.

Here I take the liberty of giving expression to a passing idea of my own, which found some favour with those to whom I mentioned it abroad, but regarding the utility or practicability of which, I can give no opinion. It being the unanimous opinion of those who have been through the late wars that the brassard on the arms of the Army Hospital Corps and surgeons, the red cross on ambulances, and the flag of the Geneva Convention, are not sufficiently conspicuous to protect the trains of wounded and those engaged in succouring them, from fire, in the mist and confusion of combat, and it being highly desirable in the merest interests of humanity to prevent such destruction as far as possible, that an international convention be proposed to clothe all surgeons, hospital assistants, apothecaries, bearers of the wounded, and drivers of ambulances in a tunic of white or other conspicuous colour, entirely peculiar to them, with trousers of a colour peculiar to each nation, to prevent persons in this, so to say, neutral garb getting through the outposts and obtaining information of the movements and intentions of

the enemy; that all ambulances be painted white, and horsed solely with white or grey horses, which must consequently be excluded from the other branches of the Service, and used as chargers by surgeons and unarmed men, employed solely on the field to look after the wounded. All fire on persons wearing the uniform agreed upon, or upon waggons thus painted and horsed, to be strictly forbidden.

I am well aware that such a proposition cannot find favour with many, and notably with the gallant Scots' Greys and the Grey Battery, but I venture to submit that such a conspicuous colour is unsuitable for field operations, and the proof of it lies in the exclusion of white or grey horses from the French service,—while they were formerly employed, almost exclusively, by the Army Reorganization Committee,—on account of the mark they offered for artillery fire during the late war, and their evident unsuitability for vedette duty. In Prussia and Austria but few grey horses are used in military service, and in Russia the country is comparatively destitute of them.

I now propose briefly to treat on the separate details of each arm of the Service, its armament, equipment, and peculiar character, having already endeavoured to set before you the points they share in common.

The Infantry

as the most important, the most numerous, and the most efficient arm of the Service, shall first occupy our attention.

The Russian footmen, ready to spring into action at the signal of the Tsar, are composed of:—

10 Regiments of guards, each with 3 battalions.
14 Regiments, of 3 battalions of Grenadiers, of which 2 regiments are attached to the Guard.
4 Caucasian regiments, of 4 battalions of Grenadiers.
148 Regiments, of 3 battalions, of Infantry of the Line.
12 Caucasian regiments of infantry of 4 battalions.
4 Battalions of Rifles of the Guard.
20 Battalions of Rifles of the Line.
4 Caucasian Rifle battalions.
4 Turkestan Rifle battalions, therefore 188 regiments, with 580 Infantry and 32 Rifle battalions, massed into 3 Divisions of Infantry of the Guard.
4 Divisions of Grenadiers.
40 Divisions of Infantry of the Line, each of about 12,000 combatants.
8 Brigades of Rifles.

Every battalion of infantry consists of four companies and one rifle company. When the three battalions parade together, the rifle companies, each bearing the number of its battalion, are brought together into one battalion. The companies are numbered successively throughout the regiment. Thus the first battalion has companies 1 to 4; the second 4 to 8; and the third 8 to 12. The regiment is commanded by a Major-General in the Guards, and by a full Colonel in the Army,

and each battalion has a Lieutenant-Colonel at its head. The regimental staff consists of—

4 Field Officers, 1 Commanding Rifle Battalion, a Regimental Adjutant, a Paymaster, Quartermaster, Musketry Instructor, an Officer in command of the non-combatant company, a Drum-Major, a Trumpet-Major, 1 Surgeon-Major, and 3 Assistant-Surgeons, 1 or 2 Chaplains, and the non-combatant company, in which are clerks, mechanics, train soldiers, and Officers' servants.

The battalion staff consists of—

A Battalion Adjutant, a Battalion Drum- and Trumpet-Major, and a trained Apothecary.

The strength of a battalion of Infantry is regulated by four scales—

(*a.*) The war strength, with 900 rank and file, of whom 60 are unarmed in reserve.

(*b.*) The augmented peace establishment with 680 rank and file, of whom 40 are unarmed in reserve.

(*c.*) The peace establishment with 500 rank and file, of whom 20 are unarmed in reserve.

(*d.*) The cadre establishment with 320 rank and file.

According to these four standards, the number of Officers and Non-commissioned Officers is determined. A Captain or second Captain is in command of a company, with a Lieutenant, Sub-lieutenant, and Ensign. In time of peace one of these Officers can always be on leave at a time.

On the war establishment a company consists of—

1 Junker (a candidate for a commission, qualifying for it in the ranks instead of at the War School).
4 Senior Sergeants.
12 Junior Non-commissioned Officers.
20 Lance Corporals.
148 Privates.
1 Pay-Sergeant.
3 Drummers.
3 Buglers.
1 Armourer Sergeant.
12 Privates in reserve.
1 Apothecary and 1 apothecary pupil.
4 Officers' servants.

In all 211 non-commissioned Officers and men. The rifle companies have an additional Subaltern and Officers' servant, 5 buglers and no drummers.

The Russian infantry is at present armed with the Krinck converted rifle, but the Berdan breechloader will shortly be issued. The rifles of all but the rifle companies, and eight picked shots per company, whose sights are adjusted to 1,200 yards, are sighted only up to 600 yards, to prevent that chance-shooting at impossible ranges in which the French troops during the late war wasted their ammunition. The men carry 90 rounds apiece, 15 in a pouch on each side of the clasp of the waistbelt, and 60 in the havresack, besides which 40 rounds per man are carried in the company transport waggon, and 60 more with

the artillery reserve. Bayonets are always kept fixed, and besides the bayonet the troops have a short sword so adjusted as not to bump against the leg on the march. The uniform is grey, the field head-dress a small chaco, the belts and straps are white in the Guard, except the rifle companies, who have black, and in the Army all wear black. The knapsack is smallish, but heavy. Altogether the soldier carries 68 lbs., including his three days' provision. The Officers and colour sergeant have a curved sword, and a pistol in a black leather case on the right hand side of the belt. The regimental colour is carried by the most distinguished non-commissioned Officer.

It is improbable that the Russian infantry soldier has any rival on the march. With their trousers tucked into their long boots, the troops step out so fast that if once 100 yards ahead of you, no walking effort will catch them, and thus they can go on day after day, existing on food which would leave our men to starve. Their proficiency, too, in gymnastic exercises is very great. Nor is this confined solely to the infantry; for there is no barrack room throughout the service which is not furnished with a wooden horse and parallel bars, on which the company practise daily throughout the winter under their Officers, and in summer, regular gymnastic apparatus is established on every camping ground. The feats they perform, fully accoutred, cavalry soldier as well as infantry, are truly wonderful. At the bayonet exercise, also, their proficiency is of no mean order, for, stimulated by small prizes, they have the most exciting matches with each other; and to teach them to thrust accurately, a straw ball is suspended from the ceiling, and the men compete, under direction, in striving to make it swing straight by a direct centre thrust. They also practise thrusting at a straw figure, behind which the instructor stands parrying the blows.

The movements of the Russian infantry are very loose, though very rapid. For instance in wheeling upon a pivot the men scramble to their places on the word "march." The drill is supposed to be based upon that practised at the Model Battalion, to which one man is sent annually per battalion for two years.

The order of march is generally in column of sections, though movements in fours are frequently performed. The Captain of a company is in front, attended by the bugler and "jalonneur," or marker, who has a small flag fixed into the muzzle of his rifle. Each company has a different coloured flag, and the number of the company thereon. In camp it is placed in the ground in front of the tent of the Company Commander. A subaltern is on the right of each section.

To prevent the men falling into the habit of halting before an enemy by doing so in peace manœuvres, when friendly foes meet, the men charge through each other, holding their rifles perpendicularly aloft. Many a little accident frequently results from a falling bayonet, but the men never lose their temper and they enjoy the fun. On one occasion, when visiting the Lithuanian Regiment of the Guard with their Commandant, General Baron Korff, his Excellency asked me what companies I should like to see turned out. Being pressed, I said the rifle companies of the two first battalions. He had the calls sounded, and

in two minutes the companies with their Officers were falling in on their private parades; in three, they were doubling towards the centre of the enormous square from opposite corners of the barracks, in five, the respective commands "front and rear turn" brought them into collision. Over went at least twenty on the slippery ice and snow, but in another minute both companies were doubling back by sections to their parades. In eight minutes from the time the bugle sounded, the men were dismissed, had deposited their arms, and were on their way to the canteen each to drink the glass of *vodki* given them by the General. There is a regimental canteen, but on a very primitive scale, for out of the farthing or so per diem that the Russian soldiers clear, there is not much margin for extravagance, nor do they want much, for they don't smoke, and only drink periodically.

Throughout the summer months infantry regiments are encamped, and then all sorts of manœuvres take place; but even in winter the bugle sometimes sounds at sunrise for a company to turn out, and off it is instantly sent to a distance of 20 or 30 versts ($\frac{7}{8}$ of a mile). At noon another is dispatched to intercept its return. The General rides out to witness the *rencontre*, which he criticises in that night's orders.

This last winter the troops at St. Petersburgh marched by brigades 80 miles out and 80 in, being but a week absent. They took their provisions with them, and were billeted at night in the villages. Although the thermometer had never risen much above zero, Fahr., the appearance of one brigade on parade at 2 o'clock, before the Emperor, on the day it came in (having done the last stage that morning), was admirable, both as to men and horses. The men were clean, and marched past as freshly as if just out of their beds.

I have already mentioned the company-transport, the company organisation for providing for the wounded; but to a yet greater degree does General Milutin endeavour to perfect the Russian infantry. Ten men per regiment are attached annually to the field artillery for six months, so that there are always at least 80 men per regiment fit to do duty as artillerymen in case of need, and eight men per company carry intrenching tools between them, and have been instructed in throwing up temporary works. The Russian soldier is very handy, most men can use the hatchet (all wooden buildings in Russia are erected with the hatchet alone, without saw or hammer), cook, and sew. All the clothing is made up and fitted in the companies, even to the spinning of the braid. Every soldier, of whatever arm, has four uniforms, all of the same pattern, though of different dates of issue. The recruit receives a complete suit of uniform, known as No. 1; in the second year of his service this becomes No. 2, and is worn on ordinary occasions, No. 1, the new suit, being reserved for high days and festivals. In the third year the oldest suit is known as No. 3, and does for barrack and rough wear, No. 2 being worn on regimental parades, and No. 1 still being in the place of honour. Again each suit rises a number, No. 4 being reserved only for barrack wear, No. 3 for rough work, No. 2 for the town and regimental parades, and No. 1 for Grand Ducal inspections. At the end of the fourth year all that is left of No. 4 becomes the property of the soldier.

You may see, from what I have said above, how independent of the other arms the Russian infantry is; how it contains within itself all it can need; how neither summer suns nor winter snows impair its training; and with what justice does the Tsar pride himself on the efficiency of his foot soldiers.

Cavalry.

The Cavalry of the Russian Army is composed of—

10 regiments of cavalry of the Guard.
18 regiments of Dragoons.
14 regiments of Lancers.
14 regiments of Hussars.

Thus, 56 regiments, with 224 combatant squadrons, are massed into—

2 divisions of cavalry of the Guard,
7 divisions of cavalry of the Line,
1 division of Caucasian Dragoons,

with a numerical strength of about 32,000 combatants, which, however, can be augmented to almost any extent by the incorporation of the irregular cavalry.

At the head of each regiment of the Guard is a Major-General; of the line, a Colonel. Two squadrons form a regimental division, or wing, commanded by a Lieutenant-Colonel.

The regiment of regular Russian cavalry is composed of five squadrons, the first four being combatant, and the fifth, commanded by a Captain selected by the election of his compeers, a depôt squadron, quartered apart from the regiment, in some suitable locality for the supply of horses, charged with the preliminary training of recruits in peace and in war, and the purchase and breaking of remounts. Government haras have lately been established in the steppes of Little Russia, where the luxuriant pasturage provides great facilities for the breeding of horses; but at present the cavalry is largely dependent on private dealers, who come and offer their horses to the Captain of the reserve squadrons.

The difficulty of forming a cavalry soldier being so much greater than that of training an infantry man, cavalry regiments are kept so nearly on their war footing, that a contingent of about 50 men and horses would bring most of them up to their due complement for the field, a system which would, in the event of war, enable the cavalry to be pushed forward to protect the frontier from the very moment of the declaration of hostilities; it will be remembered how great an advantage the Prussians thereby derived on the outbreak of the late campaign.

The Russian squadron is divided into four sections, each commanded by a subaltern, who is responsible to the squadron leader for its due efficiency, as the latter is to the Colonel for the squadron.

The squadron numbers 148 mounted Non-commissioned Officers and men, 44 dismounted Non-commissioned Officers and men, and 7 Officers.

The regimental staff is the same as in the infantry, with the addition of a veterinary surgeon.

From £20 to £27 is about the price paid for remounts. The remounts may be purchased at any age between 4 and 12, but at the termination of the 12th year they must be cast, nor are they taken on the strength of the regiment until rising six; and it is indeed necessary that they should be in the prime of life during army service, for no comfortable stable, nothing but wooden sheds, protect the horses of the Russian cavalry from the wintry blast. Standing on an average about 15·2, with short thick-set legs, they perform prodigies, in spite of the heavy weight they have to carry. Four feeds of corn, hay at morning and night, and water four times per diem, *ad libitum*, keep them in excellent condition; and being admirably groomed, always bedded down with straw, without rack chain or other head-gear besides the halter, with the horse accoutrements hanging at the end of the stall, and the horse's name, age at which purchased, when, and by whom, and the name of the rider, engraved on a bright tin plate over each stall, a visit to a cavalry stable is a most agreeable sight, for the whole of the horses of the squadron are together.

It cannot, however, be denied that influenza, which in its aggravated form turns to typhus, is occasionally epidemic in the winter; but sore backs are totally, I say totally, unknown, and why is this? The saddle, though cumbrous and heavy, never hurts the horse. Four separate folds of soft felt, each $\frac{1}{4}$ inch thick, support a wooden frame previously fitted to the horse's bare back; on the wooden frame is strapped the horse rug, and the saddle is complete. The folds of felt being interchangeable, when one is wet or hardened by dried perspiration, it is turned round or placed on the top of the other, so that a perfectly clean soft material is always next the horse's skin. It is like restuffing a saddle every day. Girth-galls are, too, quite unknown, for one "inch" strap is sufficient to secure the wooden frame and the folds underneath, and one over the blanket and saddle, makes the whole perfectly firm. No martingales or cruppers are used, and the horses tails are allowed almost to touch the ground, to enable them to brush away the flies which torment them in the summer. An improvement is shortly promised in the bridles, but at present they are clumsy and heavy. The men always ride on the curb, except in the manège, when the simple bidoon is frequently used.

From the horses we must now pass to the men they have to carry. Of considerable stature, they have not been selected as light weights, nor are their accoutrements designed to ease the horse's back; and it is somewhat astonishing to find a hussar mounted and equipped with his saddle, appointments, forage, and provision for three days, weighing over 25 stone (360 lbs.), when we are told that speed is nowadays the first qualification for cavalry.

In point of armament the Russian cavalry is somewhat behind the age, although, as in the other branches of the Service, speedy reform is promised. A curved sabre, a pistol issued in 1839, and which no one would dare fire, and a lance for the front rank men of all regiments, hussars and cuirassiers included—even in lancer regiments the

front rank only of each squadron is provided with lances—complete the weapons possessed by the Russian cavalry men. A Berdan carbine and a revolver for each man are, however, spoken of.

In personal equipment the Russian cavalry soldier differs but little from other Continental troops, boots and pantaloons being almost universal.

As to drill I am incompetent to speak besides that the cavalry move in threes, and that the riding-school drill is exactly the same as our own; but manœuvres, squadron against squadron, division against division, and regiments against regiments, besides much practice in outpost and vedette duty are carried on throughout the summer months. As to smartness, I saw a squadron of Lancers, with every man in full marching order, every horse saddled and bridled, ready in $6\frac{1}{2}$ minutes from the time the Commanding Officer entered the stable quite unexpectedly, found the men lounging about and gave the alarm.

The men ride well as a rule, but the Grand Duke Nicholas, Inspector-General of Cavalry, is constantly endeavouring to improve the equestrian talent of the Officers. At the Grand Ducal inspections, every Officer, Non-Commissioned Officer and man, passes singly before His Imperial Highness, and there are but few defects even in individuals that are not discovered.

I cannot omit to mention one point about the Russian cavalry, which is peculiar to them, and which might avail them much in the field; I mean the dragoons, who are simply mounted infantry. When it is desirable for them to act on foot, one man in three is left to hold two horses, and then unencumbered by spurs or dangling swords, but armed with rifles, they perform infantry work with the greatest efficiency. The command of the horse detachment is entrusted to the senior subaltern, who has orders to keep as far as possible under cover, yet to keep as near as possible to the dragoons acting on foot, in order that the words "to horse" may be almost immediately put into execution, in order to charge disheartened infantry, to meet cavalry face to face, or to retire swiftly before superior numbers.

Artillery.

The artillery is the arm of the Service on which many Russian Officers specially pride themselves. Were I an artilleryman I might possibly be able to say why with greater exactitude; however, I will let you judge for yourselves.

The Russian artillery consists of—

3 Brigades of field artillery of the Guard.
4 Brigades of Grenadier field artillery.
43 Brigades of Army field artillery.
1 Brigade of horse artillery of the Guard.
7 Brigades of Army horse artillery; or,
48 Rifled 9-pounder batteries.
105 Rifled 4-pounder batteries.
2 3-pounder mountain batteries.

50 Batteries of mitrailleuses.
18 Rifled 4-pounder batteries for horse artillery;
i.e., 1,400 cannon and 400 mitrailleuses.

Each field brigade of artillery is composed of two 4-pounder and one 9-pounder battery of eight guns each, in all twenty-four guns, and is attached to a division of infantry, thus giving two guns per 1,000 men; a number deemed very insufficient for a European campaign. It is therefore in contemplation to add another battery to each brigade, but whether this battery shall be of mitrailleuses is not yet decided. A brigade of horse artillery is attached to each division of cavalry in the field.

As in the battalion of infantry, there are various scales for the strength of a battery, viz.:—

(*a.*) The war establishment, when all the guns and ammunition carts are horsed, and the complement of men for five sub-divisions of which the fifth is held in reserve, is complete.

(*b.*) The augmented peace establishment, when all the guns, but only eight ammunition carts per battery are horsed, and there are but sufficient men for four sub-divisions.

(*c.*) The peace establishment, when but four guns and two ammunition carts (or four in the Guard) per battery are horsed. The four sub-divisions are kept up, but consist of fewer men.

The strength of a 4-pounder field battery on the war establishment is—

6 Officers.
255 Non-commissioned Officers and men.
160 Horses.
16 Ammunition carts, two to each gun.
2 Baggage waggons.
4 Waggons, artillery park, including a field forge.
1 Ambulance.

The 9-pounder battery has an addition of 61 men, 54 horses, 8 ammunition carts, and 1 park waggon.

The horse artillery 4-pounder battery has—

7 Officers.
330 Men.
324 Horses.
16 Ammunition carts, 2 baggage, 4 park, 1 ambulance, and 1 spare waggon.

Every battery has eight guns, and is divided into two divisions and four sub-divisions; and although the guns are nominally 9- and 4-pounders, they throw a considerably heavier projectile than guns of the same nominal calibre in other services. But still the Russians possess no field-piece capable of coping with our new 16-pounder. The Russian cannon are bronze breech-loaders.* Although they in no way deny the superiority of steel for gun metal, they retain bronze, as they are able to manufacture and repair the guns made of it in their own

* There are some steel field artillery guns in store, but they will only be issued in the event of war. Their number is not publicly known, but it is believed to be about 400.

arsenals, whereas they would be almost entirely dependent on Krupp's factory in Prussia if they adopted steel. I believe, however, that one factory of steel guns for heavy ordnance has been established.

Their retention, too, of the breech-loading system for field artillery is explained by the use of bronze guns, even if the oft-quoted expression that *Prussia* has breech-loading cannon, therefore that system must be the best, did not offer sufficient reason, for the irregularities of the bore after the bronze gun is heated, put serious difficulties in the way of muzzle-loading, added to the increase of windage. The bronze gun is but ill to be depended upon after from one to two hundred rounds, when it usually has to be returned to the arsenal to be re-cast.

I spoke just now of ammunition-carts. I said "carts" advisedly, instead of waggons, for the ammunition of the Russian artillery is carried in two-wheel carts, drawn by three horses abreast, the driver riding the near horse—a system entirely peculiar to Russia. So many disadvantages attend these caissons that I can but think that they must more than counterbalance the advantages, if any indeed exist besides the smaller space they occupy on the line of march; a wheel coming off, or the centre horse, who is in the shafts, falling, and the disaster must be complete; and not least of all, the driver must be a man of extraordinary muscle if he can control three horses, and two in one hand, with plain bidoon bits. The result frequently is that when the battery is brought suddenly into action, the three horses of the caisson are seen galloping beyond control in a contrary direction, with their precious load behind them. The body of the ammunition cart consists of a box, about 4 feet by 3, and 2 deep, divided into compartments, each holding, in the case of the 9-pounders, 34 rounds, and, as three belong to each gun, and 18 rounds (16 common shells, and 2 mitraille) are in the gun-limber, 120 rounds are available, or 130 in the case of the 4-pounder field or horse artillery gun.

As the lid of the caisson can only be opened as a whole, and it is necessary to use some exertion to open it, the delay must be serious in getting the ammunition out, if it be opened each time; yet if left open the remaining rounds would get wet if in bad weather. In the field, a spade, pick, and six fascines are carried behind each caisson, to throw up a hasty revetment or make a wide ditch passable.

With the artillery park or reserve are further conveyed—

180	rounds	for each	9 pounder.
170	„	„	4 „
60	„	„	Infantry rifle.
20	„	„	Dragoon „
10	„	„	pistol and barrack rifle.

These are so packed that the supply for a regiment, battery, or squadron can be instantly taken out and sent to the front.

As regards manœuvring, I am incompetent to speak, but I may say that I saw a battery of Horse Artillery drilling admirably on ground so slippery that a man could hardly keep his legs.

The harness of the artillery is not of the finest workmanship. The collars and pads are heavy and clumsy, and the rope traces so incon-

veniently long, that when a gun is suddenly halted, or is going down hill, they very frequently trail upon the ground and get entangled in the horses' feet. A complete set of new harness for the whole battery is always kept in store to be taken into wear when ordered on service.

I must now devote a few words to the mitrailleuses, of which there are 400 (200 more are ordered) in 50 batteries of eight pieces in the Russian service. The system is the Gatling 10-barrel, somewhat improved in the breech-mechanism by General Gorloff's (the Russian military attaché at Washington) introduction of a screw, worked by a handle, which slowly moves the breech during discharge, about six inches each way. The muzzle, of course, moves in the contrary direction, and thus the lateral range is considerably extended, and, it is asserted, is capable of covering the front of a company of infantry.

The Russian mitrailleuses were ordered in a panic after the outbreak of the Franco-Prussian war; and so great was the enthusiasm when they arrived at St. Petersburgh, that processions of welcome were organized by ecstatic ladies. Yet, now that calmer moments have succeeded to the startling events of that year, the suitability of mitrailleuses for the field is being seriously considered. The younger school of Officers support them loudly, but the older men hesitate in giving a decided opinion; yet most of them think that the *morale* of an army would be greatly impaired if unprovided with them, if placed in situations eminently adapted for their employment. One of the most difficult questions is, how shall the mitrailleuses be employed. Regimentally; a battery attached to each brigade of artillery; or massed in the artillery reserve to be employed in action at the discretion of the Commander of the artillery? This will be decided this summer, when most important experiments will be made. However, the proposition of allotting two or three pieces to each regiment of infantry has been already negatived, on account of the immense danger they would incur of being captured by a mere handful of horsemen.

The eight pieces of a mitrailleuse battery are each provided with 6,290 cartridges in 262 cases, carried in one ammunition cart. The mitrailleuse cartridge and the cartridge of the new Berdan rifle are interchangeable; a most useful provision in case the supply of either one or the other should run short.

Engineers, Irregular Troops, and Conclusion.

The engineers of the Russian service are still under the leadership of the man whose skill and bravery are as much honoured and respected in foreign countries as in his own—Todleben. Under his direction, old fortresses have been modernised, new fortresses have been built, strong works erected to prevent the new railways from being suddenly seized by a foreign foe; but despite the Polish quadrilateral, the guns of Kieff and Nicolaieff, the Russian engineers, aided by the swarms of infantry soldiers and civilians who are employed to help them, have not arrived at the time to rest from their labours.

There are 11 field Engineer battalions, each of four companies, with 5 Officers, 259 Non-commissioned Officers and men, 2 field, 2 siege, and

6 field telegraph parks. The battalion on the war strength numbers 900 rank and file, and on the peace establishment 600, of both of which, half are sappers and the other half miners.

The Pontoon Train is organised in half battalions, of two companies each. Each half battalion has 26 pontoons and 240 men, of whom half are drivers and the other half pontoniers. On the peace establishment but 60 drivers are retained. In the Russian service there are 312 pontoons.

The Irregular troops form the only branch of the Russian service which we have not yet considered. They consist of infantry, cavalry, and horse-artillery, but the majority belong to one of the two mounted arms—Cossacks of the Don, those tall powerful men on small, lean, hardy, ponies, which they guide with the thinnest of snaffle-bits and single reins, armed with long lance without a pennon, short sword, pistol stuck in the girdle, and rifle in leathern case slung behind, who, creeping silently yet swiftly on to an enemy, are ubiquitous in the field—their ponies' heads almost sniffing the ground—and have become the terror of many a foe of Holy Russia. Their dress is most picturesque. They use no spurs (except in the escort of the Emperor), but have a small lash whip slung on their wrists. They ride admirably, yet with stirrups so short that in winter, when riding in overcoats, and nothing but the calf of the leg is seen, one wonders where they have managed to stow the thigh. Members of a manly race, all of whom are soldiers, associated with, trained to arms, and accustomed to horses from their earliest infancy, always left to shift for themselves, never nurtured in luxury or comfort, these Cossacks of the Don are invaluable troops for escort, police, outpost, foraging, and scouring duty; yet their deficiency in education would probably prevent their performing European cavalry service with the same intelligence as the Prussians did in the late campaign. Their nominal number is 65,000, with 232 guns, yet this might be increased to almost any extent in case of need, for not a man in those provinces but is ready with horse and arms instantly to march to death for his Tsar. They are organised in regiments (polks) of six "hundreds" (sotnias), of which but a few are quartered in time of peace for escort duty in the principal Government towns. These are relieved every three years. During the Crimean war 84 regiments were raised.

But now, having already trespassed too long on your indulgence, I will add but a few words more. I say a few words more, for surely any lecture or paper (whatever you are pleased to term my humble effort,) on "the Russian Army" would be incomplete without a brief reference to those rumours that Russia is about to seek to disturb the peace of Europe, which are constantly taking possession of troubled and imaginative minds. It is not uncommon to be assured by people who expect a storm to gather from every cloud not bigger than even the *little* finger of a man's hand, that the Imperial houses of Romanoff and Hohenzollern are about to league together to wipe the Hapsburgs from the face of the earth, or that the inhabitants of Vienna and Petersburgh will shortly be striving to read the public telegrams from the

seat of war, or that the Muscovite hosts are making ready to punish the Teuton armies for their victories on the plains of France, or that each day detracts from the safety of our Indian Empire through Russian aggression. But do these alarmists study the situation? Do they not see that the armies of the Tsar, although numerous, are far from being ready to take the field? that, deficient of the complement of Officers, in the midst of re-arming, and inaugurating a new military organization, with yet imperfect and ill-secured communications, with an empire already too large, and the frontier line which divides it on the west from mighty and intolerant neighbours, but ill defended, with an infantile commerce, promising though it be, utterly unable to stand the rude shock of war, the Cabinet of the Emperor Alexander will do all it can for some time to come to avoid any issue at arms, and will rather entertain measures of internal reform than of territorial aggrandizement, even though it be to secure what is essential to the proper development of Russian commerce, the undisturbed exit of the Black Sea, by establishing Russian dominion at Constantinople, the naturally ruling idea of every loyal subject of the Tsar?

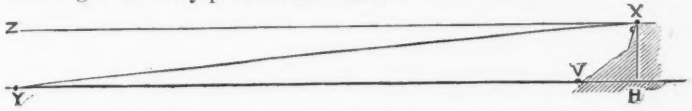
I will now conclude, apologising for the length of time I have kept you, and with the hearty expression of my thanks for the honour you have done me in coming here this day, and for the attention with which you have been pleased to listen to me. To the best of my belief, I have told you plain unvarnished facts. If there be aught in the Russian service worthy of introduction into our incomparably administered Army, you, Sir William Codrington and Gentlemen, are the best judges. I trust, however, that I have succeeded in showing you what a noble army Russia possesses, but that in improving and reorganizing it, she is but acting up to that first article of the political faith of most great Powers, including ourselves, who, however, occasionally doubt its truth, and place the negation before the second verb—"*Si vis pacem para bellum.*"

CAMPBELL'S RANGE INDICATOR.

A Paper contributed by Captain JOHN R. CAMPBELL, Hants Militia Artillery.

NEXT to efficient ordnance for the defence of our coasts, few things are more important than a good "range-finder," or (speaking in more general terms), some easy, rapid, and at the same time *sufficiently exact* method of ascertaining the distance between our guns and the enemy's ship. Nothing can be more unsatisfactory than the common process of searching this out by means of *trial shots*, as they are called, that is, by judging the distance by the eye for the first round, and correcting the elevation given to each of the following rounds by the *apparent* error as shown by the graze of the one before, until at last we hit. Against a ship in motion this system is almost absurd; one might frequently go on bungling until she was out of all range, or, worse than that, until her crew by a well-directed fire had succeeded in dismounting our most powerful gun. It must be remembered, too, that each round with the present gigantic weapons occupies several minutes and involves the cost of a very expensive projectile, besides the wear-and-tear of the gun. Yet, curiously enough, until very recently the question of "range-finders" was hardly dreamt of; at any rate it never seems to have seriously engaged the attention of our scientific military departments. Now there are several plans before the notice of the War authorities, and before many years, no doubt other new ones will appear, or improvements on the present instruments be suggested.*

It is not my intention to offer any opinion regarding the respective merits of the different range-finders we have heard of lately; indeed, I do not feel myself competent to attempt such a task were I inclined to do so. The object of the present paper is simply to describe my own designs for an instrument of this sort, suitable for coast batteries, involving very little expense, simple of application, and which will indicate with *considerable* accuracy the range of a vessel under way—not as the result of a single observation, but by a continuous process, showing it for every point of her course.



* See a paper by the author entitled "Calculation of Range for the service of Artillery," in vol. viii, page 431, of the Journal. (In that article at page 434, lines 15 and 16 from the top, the sign − ought to be + in the first fraction, and the + in the second ought to be −).

Suppose X to be the highest point on the works of a battery overlooking the sea, from which observations can conveniently be made, YH the water level at any particular height of tide, and Y the position of an enemy's ship. Join XY and draw XZ and ZH, horizontal and vertical lines, through X.

Now I assume the height HX of a flat stone at X, on which (during the time the battery is in action) the instrument stands, above the sea-level, to be always known to a yard. The height of tide is easily shown by a rough scale painted on some post, pier, or rock at the point V, or in the immediate neighbourhood of the fort; besides which, in *critical* times, a register of tides might be kept. Call this known height h; put angle ZXY (which is = angle HYX) = θ and XY (the range) = R.

Then we have $R = h$ cosecant θ

an equation giving us the proper value of R for any particular one of θ.

Now the object of my range-indicator is to measure this angle θ—let us call it the *angle of dip*—recording the result, not in degrees and minutes, but in yards of range corresponding to the height of tide at the time of observation. This is effected by the motion of a telescope mounted theodolite fashion, the range answering to any position of its axis below a horizontal line being read off on a high multiple of the arc described by the extremity of its axis. The telescope, by means of a toothed arc gearing with an endless screw (or in large instruments it may be a pinion) gives motion to a circular disc, causing it to make one exact revolution while it moves through an angle of dip of 3 degrees—for very few coast batteries are more required, but the principle is the same whatever limit we assign to θ. On the surface of this disc the range is shown in a manner I shall presently describe.

Fig. 1 (*see* plate) is a side elevation of the arrangement, and Fig. 2 a plan. The framing (brass) mainly consists of two inverted V-shaped cheeks, AA (in the elevation) being one of them, between which the telescope, T, is supported in plummer-blocks, *t*. These cheeks are erected on a circular plate, E, which rests and is pivoted on another plate F, the latter being in a piece with the triangular base or pedestal. For the sake of portability, the upper part of the instrument can be lifted out of the socket formed in the base. L is a spirit-level carried on the revolving plate E, and *w*, *w*, *w*, three levelling screws by means of which the instrument is brought into adjustment. The telescope—a powerful one about 16 inches in length and furnished with the usual cross-wires—has attached to its side a short toothed arc R, whose centre is at *t*, in gear with the endless screw S, the shaft of which is borne on a projecting branch, BB, of the cheek AA. On this shaft is fixed a circular disc of zinc, D, 2 feet in diameter, and the radius (6 inches) and pitch of tooth of the arc are such that D makes exactly one revolution for a motion of the telescope (from the horizontal position) through 3 degrees. The manner of mounting the screw with its disc is shown more plainly in Fig. 3, which is an end elevation of this part of the arrangement drawn to twice the scale used in the other figures. The same letters, however, refer to the same parts in all. S is the screw

Fig 1

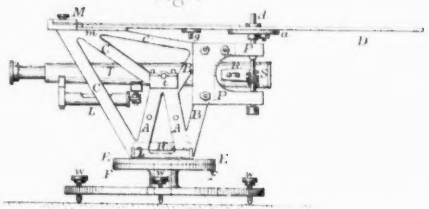


Fig 3

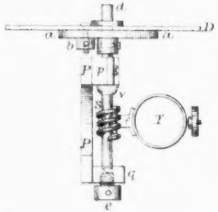


Fig 4

CAMPBELL'S RANGE INDICATOR

Fig 2

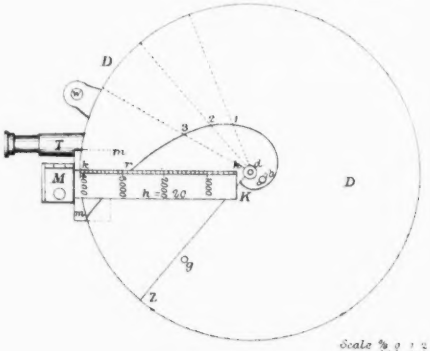
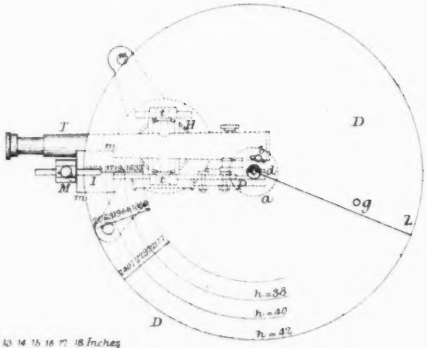


Fig 5



passing through a plummer-block, p; v a boss on its shaft to keep it in position, while the lower end rests on a screw, e, held in a small step, q, by means of which it is prevented from working loose. Both plummer-block and step are fixed to a plate, PP, and this is clamped by three bolts to another plate forming part of the projection BB. The bolts pass through short horizontal slots in the latter plate to allow of a small amount of primary adjustment by the maker before it leaves his hands. The toothed arc, R, is similarly clamped to a piece, f, projecting from the side of the telescope. The disc rests on a circular table a (virtually forming a portion of the screw shaft), and is secured in its proper position by a bolt, b, with a capstan-headed nut below. This bolt passes through a hole in the table and a slot in the disc, thus permitting of the latter's adjustment.* Kk (best seen in Fig. 2) is a fixed scale, formed of a strip of cardboard and held in position by having its end clamped between two plates, M (the upper one being hinged on to the lower, and the whole secured by a screw passing through a hole in the strip). The plates, M, are carried on a branch, C, of the framing, and in order to stiffen the arrangement there is a bar, C', connecting the two ends of the instrument, and supporting a plate, m, over which a portion of the disc (liable to be pressed down by the fingers of the operator) passes. Screwed into the disc, and projecting below it, is a movable stop, g; this, by coming in contact with the bar, limits the motion of the disc to somewhat less than a complete revolution, thus preventing the screw, S, from running out of gear with the toothed arc.

I now come to an important feature of the apparatus, viz., the surface of the disc. This is painted white, or coated with paper, and has a curve described on it in the following manner. A large number of radii are drawn, and on each, measured from d, the centre, is marked off (to a convenient scale) the range the instrument placed at a certain height, h, ought to indicate, supposing that radius brought into a position coinciding with the edge, $k\,k$, of the fixed scale, which itself is in line with d. Practically, it is easiest to begin by dividing the surface of the disc into 36 angular parts, each of which will correspond to 5 minutes of dip. A number of points, 1 . 2 . 3 . . . r, will thus be obtained lying in a spiral curve. This curve is then carefully traced by a black or red line, the radii, except that marked d Z, which corresponding to $\theta = o$, and $\theta = 3°$, being afterwards obliterated. The disc is in its proper position on the screw shaft when this *zero* radius is found to coincide with the edge of the scale, the axis of the telescope having first (by means of the spirit level, L') been rendered horizontal.

It will be easily seen that the polar equation to the curve is—

$$R' = h \text{ cosecant } \frac{\theta'}{120}$$

where d is the pole, R' the radius vector, and θ' the angle Z d r. dZ produced is an asymptote to the curve.

* An opening is formed in the plate, P, in order that the position of the toothed arc may be regulated without dismounting the screw. In all the figures some minor details—small screws, &c.—are omitted.

Supposing now the divisions on the scale $k\,k$ to correspond with the unit of measure employed in describing the curve, it is evident that as the disc revolves during a change of position of the vessel on whose water-line the axis of the telescope is directed, a *near approximation* to her range will constantly be shown on the scale at r, the point of intersection of its edge, $k\,k$, with the curve. In Fig. 2 the instrument is arranged for a height of 20 yards, and the ultimate divisions, or *units*,* of the scale may correspond to distances in the range of 20 yards each. The same curve will, however, serve for *any* height (between very considerable limits) simply by changing the fixed scale; for since, supposing θ to be constant, the range is proportional to h, we have only to make the unit of division inversely proportional to the height—taking any scale already constructed for a known height as a *datum* for our new one—and the result is obtained. Thus, having a scale as in Fig. 2, correct for 20 yards, if we wish to apply the same curve to a position 27 yards above sea level, we must make the divisions in our new scale $\frac{20}{27}$ times the length of those (signifying the same quantity of range) in the other. A scale can be marked out by any artillery Officer in less than an hour. The process, a very simple one, is this. An old scale, $k\,k$ (Fig. 4) being its edge, is pinned on to a drawing board, and the position, d, of its zero found. A slip of cardboard for the new scale is then attached to the board, with its edge, $k'\,k'$, in line with d and making any angle $k'\,d\,k$ with $k\,k$. Suppose the old scale is for a height h and we require the new one for h', any two distances, $d\,x$, $d\,y$, are marked off on the edges of the old and new scales respectively, such that—

$$d\,x : d\,y :: h' : h$$

Then, joining $x\,y$, and through the divisions of $k\,k$, drawing lines parallel to $x\,y$, these lines evidently divide the edge $k'\,k'$ in the manner required, *i.e.*, into a scale correct for the height, h'; d will be the zero, and the same figures must be attached to the divisions as those found opposite the divisions on $k\,k$, from which they are severally derived.

Every fort ought to possess five or more scales referring to as many different heights of tide, since an error of a yard or two in h produces a considerable one in the observation of a long range, or indeed of a comparatively short one if measured from a low position. For distances over 3,000 yards it is as well to add 1 yard, and for the less common ones, exceeding 4,500 yards, 2 yards, to h in constituting scales, to allow (roughly) for the curvature of the earth.

In order to find a scale suitable to the tide level at any particular time, it is not always necessary to consult any measure marked on a post or pier—a buoy, or half sunken rock, the exact distance of which is known, will answer the same purpose; for, having directed the axis of the telescope to the water line on this object, we have merely to choose that scale which gives this distance correctly.

Fig. 5 is a plan of the "range-indicator" under a slightly different form, but one that, simple as it at first sight appears, I consider inferior in

* These divisions are too minute to be inserted in the figure.

more than one respect to the arrangement I have described. Here the disc, instead of having a curve described on its surface, is divided by radii into angular spaces corresponding to every so many minutes of dip—one minute for the long ranges, two or three for the short. On each radius is written the range for several heights of tide the instrument ought to show when that radius is in line with a fixed pointer, I, clasped in a socket, M. The socket is supported on a branch of the framing in the same position as the plates M in Fig. 1, and the pointer, which can be advanced or drawn back, is clamped by a thumb-screw. The number of yards for different tide levels are arranged in zones; a few only are inserted in the figure. *d* Z is the zero radius. Of course an instrument on this plan must have its disc specially constructed for the height of fort above mean tide where it is applied. A plan of the parts below the disc, common to both forms of indicator, is shown in this figure by dotted lines.

In using the "range-indicator," it is best to employ two Non-commissioned Officers, although one will do. The duty of the first is to keep the intersection of the cross wires constantly on the lowest visible point of the object under fire, elevating or depressing the telescope by turning the disc; he also reports on the effect of shots. That of the second is to read off the range, and call it out (as often as it appears to change) to the Officer who is directing the firing.

The merits I venture to claim for the instrument are three, the first, however, only applying to the form with a curve on the disc:—

1st. The same instrument is applicable to all (or nearly all) heights, simply by using different scales.

2nd. The working of it requires no technical education, any intelligent gunner may be taught the use of it in an hour.

3rd. The range is *constantly* known (to a sufficient degree of accuracy), no matter how frequently or how rapidly it may vary; in fact, with this arrangement no time is lost by observations independent of one another, which, from the time they require, are often in the case of a moving ship, valueless before their results can be applied.*

I believe such an instrument might occasionally be useful for other purposes besides that of range finding, by the addition of a compass, H, mounted on the parallel plate E. This gives us the power of setting the cross wires on any point out at sea of which we know the direction and distance, and thus we are enabled to *watch* the position of a sunken torpedo.

* This range indicator appears to me especially applicable to forts surrounded by water, like those now building at Spithead, where, owing to the smallness of area, no trigonometrical measurement of range from a *horizontal* base is practicable.